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OF

PATENTEES.

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GRAPHOPHONE PATENT VOLUME 19.

MAY 19 1920
July - December, 1917.



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Vol. 20¹⁹

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J. Jonasson,
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C. Beecroft,
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C. H. Verity,
M. Clark,
R. Colling,
H. Benson,
J. H. Dooley,

DESIGN PATENTS ARE BOUND IN BACK OF
THIS VOLUME.

(All of those for 1917).

(Arranged numerically).

(61 Design patents for 1917)

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J. H. Dooley,
H. T. Schiff,
A. Vasselli,
C. F. Cookson,
W. T. Lakin,
A. N. Petit,
A. N. Petit,
F. L. Wood,
L. Lumiere,
W. G. Shelton,
H. C. Egerton,
J. A. Sowell,
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P. B. Delany,
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L. McArthur,
P. J. Packman,
T. Ahearn,
S. Canda,
F. Puschnerus,
H. W. Rogers,
P. Catucci,
P. Dodge.

Note:- In this Volume there are bound 149 mechanical patents
and 61 Design patents, making a total of 210 patents bound herein.



J. A. WESER.
 BRAKE FOR TALKING MACHINES.
 APPLICATION FILED JUNE 27, 1916.

1,231,826.

Patented July 3, 1917.
 4 SHEETS—SHEET 1.

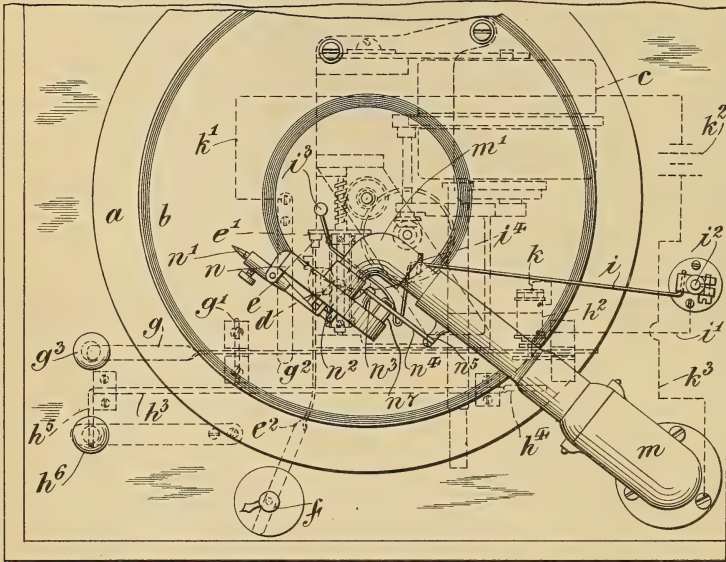


Fig. 1.

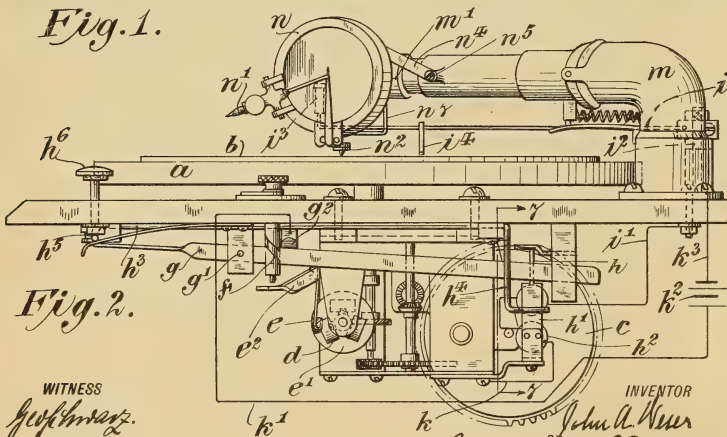


Fig. 2.

WITNESS

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 ATTORNEYS

J. A. WESER.
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 APPLICATION FILED JUNE 27, 1916.

1,231,826.

Patented July 3, 1917.

4 SHEETS—SHEET 2.

Fig. 3.

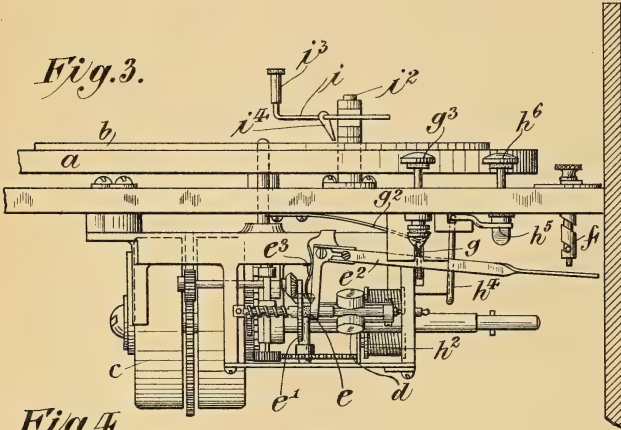


Fig. 4.

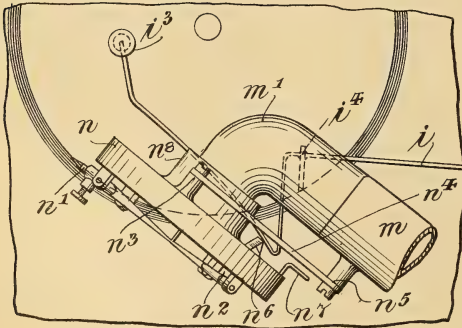


Fig. 6.

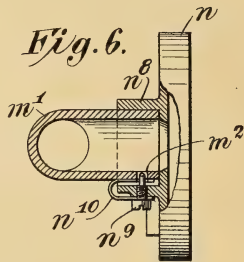


Fig. 5.

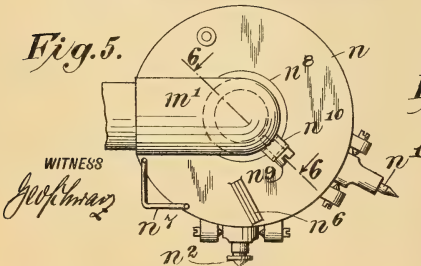
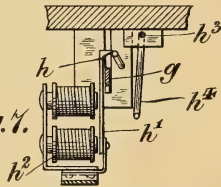


Fig. 7.

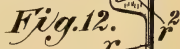
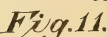


INVENTOR

John A. Weser
 BY
 Redding, Fiebel, & Mallet
 ATTORNEYS

APPLICATION FILED JUNE 27, 1916.

4 SHEETS—SHEET 3.



ATTORNEYS

Geo. Schwarz

J. A. WESER.
 BRAKE FOR TALKING MACHINES.
 APPLICATION FILED JUNE 27, 1916.

1,231,826.

Patented July 3, 1917.

4 SHEETS—SHEET 4.

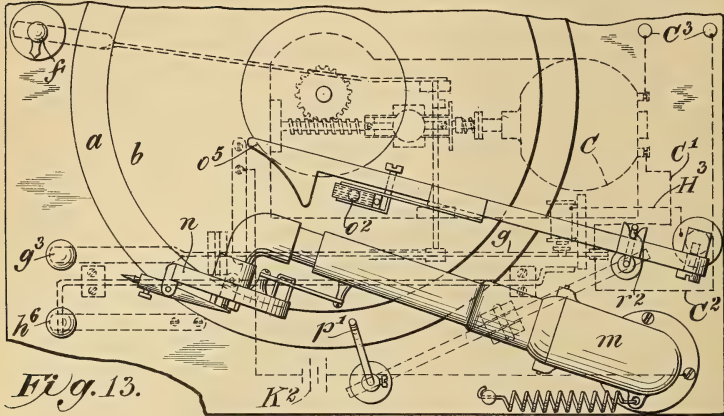


Fig. 13.

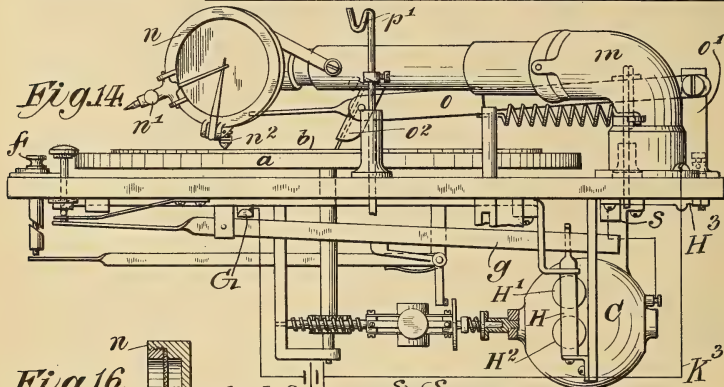


Fig. 14.

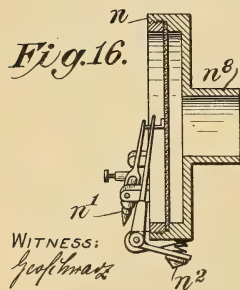


Fig. 16.

WITNESS:
Joseph M. ...

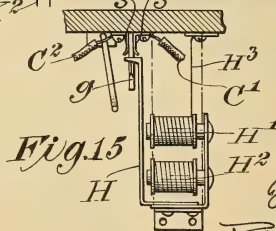


Fig. 15.

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UNITED STATES PATENT OFFICE.

JOHN A. WESER, OF NEW YORK, N. Y.

BRAKE FOR TALKING-MACHINES.

1,231,826.

Specification of Letters Patent.

Patented July 3, 1917.

Application filed June 27, 1916. Serial No. 106,099.

To all whom it may concern:

Be it known that I, JOHN A. WESER, a citizen of the United States, residing in the borough of Manhattan of the city of New York, in the State of New York, have invented certain new and useful Improvements in Brakes for Talking-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to machines of the disk type and has for its object to improve the construction of such machines in certain details and particularly to provide improved devices for stopping a machine at a predetermined point and particularly when the needle is at or near the end of the record groove. The invention further has to do with an automatic self-finding and stop device which positions itself automatically at the proper place to bring about the stopping of the record at a predetermined point, and with the association with the automatic self-finding device of means to raise this device from the face of the record automatically when the sound box is raised and removed from the record. This automatic finding device which automatically finds the correct stopping place at the end of a record for any kind of disk phonograph records, can be attached to any kind of stopping device for either spring or electrically driven phonographs.

As there is on all records a blank space before the record begins to play, there is a spring attached to the tone arm to force the arm against the playing part of the record. When it is placed on the blank space, this prevents setting it in the grooves as it automatically glides to the grooves at the beginning of a record. There is also a blank space at the end of each record disk. The finder arm automatically drops on the blank space when the tone arm is positioned to play a record. The finder arm is assisted by a light spring and with the revolving of the record it automatically forces the finder arm against the end of the record grooves and remains there until the tone arm has also reached the end of the record when contact between the two is made and a magnet energized to stop the operation.

The invention will be more fully explained hereinafter with reference to the ac-

companying drawings in which it is illustrated, and in which—

Figure 1 is a top view of a talking machine equipped with the improvements.

Fig. 2 is a view of the same in elevation, as seen from below in Fig. 1.

Fig. 3 is a view of the same in elevation as seen from the left hand in Fig. 1, a portion of the casing being indicated in section.

Fig. 4 is a detail top view on a larger scale, showing particularly the devices connected with the tone arm and sound box.

Fig. 5 is a view in side elevation, as seen from the rear, of the sound box with a portion of the tone arm.

Fig. 6 is a detail view partly in section on the plane indicated by the line 6—6 of Fig. 5, looking in the direction of the arrows.

Fig. 7 is a detail view showing particularly the electromagnet and its immediately associated parts for stopping the machine.

Fig. 8 is a partial view, similar to Fig. 1, but showing a slightly modified embodiment of the invention.

Fig. 9 is a partial view in side elevation of some of the parts shown in Fig. 8.

Figs. 10–12 are details to be referred to.

Fig. 13 is a view similar generally to Fig. 8 but showing a talking machine in which an electric motor is used in place of a spring motor for driving the turn-table.

Fig. 14 is a fragmentary view in side elevation of some of the parts shown in Fig. 13.

Fig. 15 is a detail view showing the electromagnet and its associated parts for breaking the circuit of the magnet and the actuating motor.

Fig. 16 is a view in vertical section of a modified form of sound box.

Except as hereinafter indicated, the talking machine to which, in the accompanying drawings, the present improvements are applied, is of substantially ordinary construction. It comprises the rotating turn-table *a* on which the record disk *b* is placed as usual, a motor *c* provided with a governor *d* and a brake *e* arranged to bear against a brake disk *e'* on the governor shaft, for controlling the starting, the stopping and the speed of the motor and the turn-table, the brake *e* being carried, as usual, by a right angled brake lever *e²* which is acted upon by a light spring *e³* to move the brake away from the

brake disk. The speed controlling device *f*, of ordinary character, is arranged to bear on the long arm of the brake lever *e*² for the purpose of regulating the pressure of the brake *e* against the brake disk *e'*, when the machine is in operation, thereby regulating the speed of rotation of the turn-table.

Overlying the brake lever *e*² transversely is a stopping and starting lever *g*, which is pivoted at *g'*, and has its longer arm acted upon by a spring *g*² which acts normally to press the longer arm downward, as shown in Fig. 2. Downward movement of the longer arm of the lever *g* presses downward the horizontal arm of the brake lever *e*² and therefore presses the brake *e* against the brake disk *e'* to stop the machine, while a lifting of the longer arm of the lever *g* relieves the brake lever *e*² from pressure and permits the spring *e*² to move the brake lever so as to withdraw the brake from the brake disk for starting, the continuing pressure of the brake against the disk, and therefore the speed of the machine, being regulated by the speed regulating device *f*.

The short arm of the stopping and starting lever is subjected to the action of a starting and resetting plunger *g*³, by which the lever may be moved against the pressure of the spring *g*² and the action of gravity to release the brake lever *e*² and at the same time to reset the lever *g* in position for release either by hand or by the automatic stopping devices now to be described.

The lever *g* is normally held in the running position by a latch *h*, controlled by the armature *h'* of an electromagnet *h*². The armature *h'* may be moved by hand to disengage the latch and release the lever *g*, by means of a bell crank lever *h*³ having one arm *h*⁴ adapted to bear against the armature *h'* and another arm *h*⁵ adapted to be actuated by a spring supported plunger *h*⁶.

For automatic stopping, the circuit of the magnet is closed and the magnet energized by devices which act at a predetermined time or when the needle is at or near the end of the groove of the record.

The coils of the magnet are connected on one side, as indicated in Fig. 1, through a connection *i'* and a swiveled support *i*², with a movable contact arm *i*. The latter is provided with a handle *i*³ by which the position of the contact arm may be changed as desired, and with an indicating finger *i*⁴ which is held normally just above the record disk.

On the other side the coils of the magnet are connected through a wire *k* with the frame of the magnet to which the latch *h* is attached and thence to the lever *g* through the spring *g*² by a wire *k'* to the battery *k*², and thence by a wire *k*³ to the tone arm *m* and a terminal carried thereby for contact with the contact arm *i*, when the tone arm,

in its horizontal movement, reaches a position where the needle carried by the sound box thereof is at or near the end of the groove of the record disk.

The tone arm is mounted for movement and is constructed in the usual manner. At its extremity it receives an elbow *m'* which is movable longitudinally with respect to the tone arm and carries, rotatable on its outer end, the sound box *n*.

In order that the machine may be used with record disks of either of the standard types, that is, with the sound wave impressions made vertically or laterally, the sound box is provided with two needles, the one, *n'*, for use with records in which the sound impressions are made laterally, and the other, *n*², for use with records in which the sound impressions are made vertically. To bring one or the other of the needles *n'* *n*² into operative position, the sound box must receive a partial rotation about its axis and at the same time its position with respect to the axis of support of the tone arm must be changed, that is, the sound box must be moved longitudinally with respect to the tone arm. To accomplish this result the sound box has pivoted thereto, as at *n*³, a link *n*⁴, the other end of which is pivoted, as at *n*⁵, to the tone arm *m*, so that as the sound box is rotated on the end of the elbow *m'*, the elbow itself is moved longitudinally on the end of the tone arm, whereby the correct position of the needle for either type of records is assured.

The contact arm *i*, preferably bent as shown in Fig. 1, is arranged for contact with either of two terminals *n*⁶ and *n*⁷ carried by the sound box on its rear face, such terminals corresponding respectively to the needles *n'* and *n*², so that which ever needle is in playing position, contact will be made and the circuit closed through the magnet *h*² whenever that needle is at or near the end of the groove of the record disk or in such other position as is predetermined.

As soon as the circuit is closed by the described means the magnet *h*² is energized, the armature *h'* is attracted and the latch is operated to release the starting and stopping lever *g* which then moves to the position shown in Fig. 2, bearing down upon the brake lever *e*² and causing the brake *e* to be pressed against the brake disk *e'* to stop the machine.

In the embodiment of the invention thus far described the contact arm *i* stands in a fixed position and the circuit is closed and the machine stopped when the contact or terminal carried by the tone arm reaches the predetermined position of the terminal on the contact arm. In Figs. 8, 9 and 10 is illustrated a slightly different embodiment of the invention in which the contact arm *o* swings in a horizontal plane and is caused to

move automatically in one direction or the other toward its proper position for contact with the tone arm at the predetermined time, thereby constituting an automatic finder which need not be positioned by the attendant. The arm *o* is hinged on a vertical spindle *o'* and carries near its free end an adjustable brush *o²*, the details of construction of which are illustrated most clearly in Fig. 11. The brush proper is mounted in a rectangular open ended frame and is provided with a threaded shank *o³* with which cooperates a thumb nut *o⁴* carried in the frame, whereby the brush may be raised or lowered as will be evident. The contact end of the arm *o* is formed with a curved face *o⁵*, the form of which is such that the contacts *n⁶* and *n⁷* on the sound box can contact therewith only when the tone arm has assumed a predetermined angular position with respect to the arm *o*, thereby insuring against the accidental stoppage of the motor through the premature engagement of the tone arm and the contact arm. Of course, the shape of the curve on the face *o⁵* will depend also upon the distance between the axes of rotation respectively of the tone arm and the contact arm, but these axes having once been determined, the face *o⁵* can be shaped readily so that stoppage of the motor will be brought about only when the two arms are in predetermined relationship, that is, only when the needle has reached the desired point on the record. The construction of the arm *o*, it will be evident, is such that when it is permitted to swing freely, it might be dropped by the operator at any point on the record, whether on the smooth portion thereof or on the grooves, and would be impelled by contact with the record to a point directly over the innermost groove. To this extent, the arm may be said to position itself automatically for stoppage of the record at the desired predetermined point. By placing the tone arm on the hook *p*, the automatic finder arm *o* is automatically lifted and thrown into its initial position beyond the playing position of the records and the flexible brush *o²* falls on the blank central part of the record, but eccentrically to the center thereof. As the record disk revolves the centrifugal force, assisted by a light spring *o⁶*, forces the brush against the grooves and as the record grooves are spiral in opposition, the contact lever *o* remains therein until the sound box extensions make the contact at the end of a selection and stop the record in the manner described. The contact arm *o* also has a yielding holder which holds the guide brush or pin. This permits an adjustment of the brush with relation to the record and, being of flexible material, precludes the transmission of any sound by its contact with the revolving record. However, the improved construction

illustrated in Figs. 8 and 9 goes further and provides cooperating means for raising the contact arm *o* from the record when the sound box is raised therefrom for replacement of a disk. These devices comprise the vertically disposed rest or supporting rod *p*, which is mounted near the edge of the turn-table *a* and preferably has its upper end hooked, as at *p'*, to receive and support the tone arm when the latter is raised from the record and placed on the hook. The lower end of the rod *p* engages a lever *q*, the other end of which supports a vertically disposed rest rod *r*, the upper end of which is formed with a fork *r'* to receive loosely the contact arm *o*, as indicated clearly in Fig. 12. From this description, it will be evident that when the tone arm is placed on the hook *p'*, the rod *p* will be forced downward vertically, thereby rocking the lever *q* and simultaneously raising the rod *r* with the contact arm *o*. In this way the latter is automatically raised from the face of the record whenever the disk is to be replaced. A further feature resides in the provision of a cam face *n²* in the fork *r'* which engages the contact arm *o* whenever the latter is raised from the table and impresses a lateral pressure thereon sufficient to swing the arm to its initial position. When the brush *o²* of the arm *o* rests on the face of the disk and the tone arm is out of engagement with the hook *p'*, the lever *q*, under the influence of gravity, or a spring, permits the forked rod *r* to drop vertically to a position well below the arm *o* and have free lateral movement therein, as will appear from Fig. 12.

As a convenient means for securing the sound box *n* rotatably on the end of the elbow *m*, the hub *n⁸* of the sound box is provided with a screw pin *n⁹* which enters a circumferential slot *m²* in the elbow, whereby the necessary rotary movement of the sound box is permitted within determined limits. A friction spring *n¹⁰*, U-shaped, as shown in Fig. 6, and secured by the screw pin *n⁹* to the hub *n⁸*, bears against the elbow *m'* to give the necessary frictional resistance.

The modified construction shown in Figs. 13-15 is identical in all essential details with the embodiments heretofore described, except that there is employed as a prime mover an electric motor *C* in place of the spring motor *c*. The distinctive feature of this construction resides in the provision of a separate circuit for the electric motor *C* which is led through the spaced yielding contact members *s* for the knife switch or starting lever *g*. As indicated clearly in Fig. 15 one lead *C'* of the motor circuit is connected to one of the clips *s*, while the other lead *C²* is connected to the other clip. In this way, it will be evident that the motor circuit is controlled primarily by the

starting lever or switch *g* which, when introduced between the clips *s*, completes the motor circuit and is held in raised position by the armature *H* of the electromagnets *H'*, *H*², during the playing of the record. The circuit for the magnets *H'*, *H*² is also completed through the starting lever *g* and spring terminal *G* and armature *H*. The spring terminal *G* is in the circuit of the battery *K*² which is grounded conveniently, as through the lead *K*³ on the tone arm. The magnets *H'*, *H*² are connected in series and grounded as through the lead *H*³ on the finder arm. The circuit of the motor *C* is preferably made through lighting mains, connections to which are indicated conventionally at *C*³. From the description given, it will be evident that when the tone arm makes contact with the finder arm the local circuit of the magnets *H'*, *H*² will be made, the starting lever *g* having been set previously in the manner hereinbefore described. After the magnets are energized, the armature *H* will be attracted so as to release the starting lever *g* and it may drop under the influence of gravity and the spring terminal *G* from the position out of the clips *s*, *s*, thereby interrupting the circuit of the motor *C* and breaking its engagement with the armature *H*. Immediately upon the interruption of the circuit of the motor *C* rotation of the turn-table will be stopped. Simultaneously, interruption of the circuit of the magnets will break the circuit of the battery *K*², thereby leaving this circuit dead in spite of the continued engagement of the tone arm with the finder arm until subsequent resetting.

It will be understood that various changes in details of construction and arrangement may be made to suit different conditions of use and that the invention is not restricted to the precise arrangement shown and described herein.

I claim as my invention:—

1. In a talking machine, the combination of a motor, a turn table driven thereby, stopping devices for the motor, a tone arm, an electromagnet to control the stopping devices, an electric circuit including the magnet and a source of electric energy, a terminal contact therefor carried with the tone arm, a contact arm constituting the other terminal and mounted movably on the machine, and a finger carried by said arm and adapted to rest on the record disk and to engage the groove thereof to cause automatically swinging movement of the contact arm to its proper position for engagement with the tone arm.

2. In a talking machine, the combination of a motor, a turn table, a brake lever for the motor, a stopping lever normally free of the brake lever but adapted to actuate the same to stop the machine, a latch to

hold the stopping lever in operative position, an electromagnet to disengage the latch and release the stopping lever, a normally open electric circuit including a magnet, and devices actuated by the movement of the tone arm to close the circuit and thereby to energize the magnet and release the stopping lever and break the circuit.

3. In a talking machine, the combination of a motor, a turn table, a brake lever for the motor, a stopping lever normally free of the brake lever but adapted to actuate the same to stop the machine, a latch to hold the stopping lever in inoperative position, an electromagnet to disengage the latch and release the stopping lever, a normally open electric circuit including a magnet, a tone arm, a contact terminal carried by the tone arm, and a second terminal with which the first terminal is brought into contact by the movement of the tone arm.

4. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, devices carried by the swinging arm to co-operate with the record disk and move the swinging arm automatically to a predetermined position and means for stopping the motor, the operation of which is initiated by contact of the tone arm with the swinging arm.

5. In a talking machine, the combination of a motor, a turn table driven thereby, stopping devices for the motor, a tone arm, an electromagnet to control the stopping devices, an electric circuit including the magnet and a source of electric energy, a terminal contact carried with the tone arm, a contact arm constituting the other terminal and provided with a contact face of such form as to be engaged by the terminal on the tone arm only when the two arms are in predetermined relative positions and devices carried by the contact arm to co-operate with the record disk and move the swinging arm automatically to such predetermined position.

6. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact with the swinging arm, and means adapted to be engaged by the tone arm for moving the swinging arm automatically away from the record grooves when the latter is to be removed from the turn table.

7. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact of the tone

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move automatically in one direction or the other toward its proper position for contact with the tone arm at the predetermined time, thereby constituting an automatic finder which need not be positioned by the attendant. The arm o is hinged on a vertical spindle o' and carries near its free end an adjustable brush o^2 , the details of construction of which are illustrated most clearly in Fig. 11. The brush proper is mounted in a rectangular open ended frame and is provided with a threaded shank o^3 with which coöperates a thumb nut o^4 carried in the frame, whereby the brush may be raised or lowered as will be evident. The contact end of the arm o is formed with a curved face o^5 , the form of which is such that the contacts n^6 and n^7 on the sound box can contact therewith only when the tone arm has assumed a predetermined angular position with respect to the arm o , thereby insuring against the accidental stoppage of the motor through the premature engagement of the tone arm and the contact arm.

Of course, the shape of the curve on the face o^5 will depend also upon the distance between the axes of rotation respectively of the tone arm and the contact arm, but these axes having once been determined, the face o^5 can be shaped readily so that stoppage of the motor will be brought about only when the two arms are in predetermined relationship, that is, only when the needle has reached the desired point on the record. The construction of the arm o , it will be evident, is such that when it is permitted to swing freely, it might be dropped by the operator at any point on the record, whether on the smooth portion thereof or on the grooves, and would be impelled by contact with the record to a point directly over the innermost groove. To this extent, the arm may be said to position itself automatically for stoppage of the record at the desired predetermined point. By placing the tone arm on the hook p , the automatic finder arm o is automatically lifted and thrown into its initial position beyond the playing position of the records and the flexible brush o^2 falls on the blank central part of the record, but eccentrically to the center thereof. As the record disk revolves the centrifugal force, assisted by a light spring o^6 , forces the brush against the grooves and as the record grooves are spiral in opposition, the contact lever o remains therein until the sound box extensions make the contact at the end of a selection and stop the record in the manner described. The contact arm o also has a yielding holder which holds the guide brush or pin. This permits an adjustment of the brush with relation to the record and, being of flexible material, precludes the transmission of any sound by its contact with the revolving record. However, the improved construction

illustrated in Figs. 8 and 9 goes further and provides coöperating means for raising the contact arm o from the record when the sound box is raised therefrom for replacement of a disk. These devices comprise the vertically disposed rest or supporting rod p , which is mounted near the edge of the turn-table a and preferably has its upper end hooked, as at p' , to receive and support the tone arm when the latter is raised from the record and placed on the hook. The lower end of the rod p engages a lever q , the other end of which supports a vertically disposed rest rod r , the upper end of which is formed with a fork r' to receive loosely the contact arm o , as indicated clearly in Fig. 12. From this description, it will be evident that when the tone arm is placed on the hook p' , the rod p will be forced downward vertically, thereby rocking the lever q and simultaneously raising the rod r with the contact arm o . In this way the latter is automatically raised from the face of the record whenever the disk is to be replaced. A further feature resides in the provision of a cam face r^2 in the fork r' which engages the contact arm o whenever the latter is raised from the table and impresses a lateral pressure thereon sufficient to swing the arm to its initial position. When the brush o^2 of the arm o rests on the face of the disk and the tone arm is out of engagement with the hook p' , the lever q , under the influence of gravity, or a spring, permits the forked rod r to drop vertically to a position well below the arm o and have free lateral movement therein, as will appear from Fig. 12.

As a convenient means for securing the sound box n rotatably on the end of the elbow m , the hub n^8 of the sound box is provided with a screw pin n^9 which enters a circumferential slot m^2 in the elbow, whereby the necessary rotary movement of the sound box is permitted within determined limits. A friction spring n^{10} , U-shaped, as shown in Fig. 6, and secured by the screw pin n^9 to the hub n^8 , bears against the elbow m' to give the necessary frictional resistance.

The modified construction shown in Figs. 13-15 is identical in all essential details with the embodiments heretofore described, except that there is employed as a prime mover an electric motor C in place of the spring motor a . The distinctive feature of this construction resides in the provision of a separate circuit for the electric motor C which is led through the spaced yielding contact members s for the knife switch or starting lever g . As indicated clearly in Fig. 15 one lead C' of the motor circuit is connected to one of the clips s , while the other lead C^2 is connected to the other clip. In this way, it will be evident that the motor circuit is controlled primarily by the

starting lever or switch *g* which, when introduced between the clips *s*, completes the motor circuit and is held in raised position by the armature *H* of the electromagnets *H'*, *H*², during the playing of the record. The circuit for the magnets *H'*, *H*² is also completed through the starting lever *g* and spring terminal *G* and armature *H*. The spring terminal *G* is in the circuit of the battery *K*² which is grounded conveniently, as through the lead *K*³ on the tone arm. The magnets *H'*, *H*² are connected in series and grounded as through the lead *H*³ on the finder arm. The circuit of the motor *C* is preferably made through lighting mains, connections to which are indicated conventionally at *C*³. From the description given, it will be evident that when the tone arm makes contact with the finder arm the local circuit of the magnets *H'*, *H*² will be made, the starting lever *g* having been set previously in the manner hereinbefore described. After the magnets are energized, the armature *H* will be attracted so as to release the starting lever *g* and it may drop under the influence of gravity and the spring terminal *G* from the position out of the clips *s*, *s*, thereby interrupting the circuit of the motor *C* and breaking its engagement with the armature *H*. Immediately upon the interruption of the circuit of the motor *C* rotation of the turn-table will be stopped. Simultaneously, interruption of the circuit of the magnets will break the circuit of the battery *K*², thereby leaving this circuit dead in spite of the continued engagement of the tone arm with the finder arm until subsequent resetting.

It will be understood that various changes in details of construction and arrangement may be made to suit different conditions of use and that the invention is not restricted to the precise arrangement shown and described herein.

I claim as my invention:—

1. In a talking machine, the combination of a motor, a turn table driven thereby, stopping devices for the motor, a tone arm, an electromagnet to control the stopping devices, an electric circuit including the magnet and a source of electric energy, a terminal contact therefor carried with the tone arm, a contact arm constituting the other terminal and mounted movably on the machine, and a finger carried by said arm and adapted to rest on the record disk and to engage the groove thereof to cause automatically swinging movement of the contact arm to its proper position for engagement with the tone arm.

2. In a talking machine, the combination of a motor, a turn table, a brake lever for the motor, a stopping lever normally free of the brake lever but adapted to actuate the same to stop the machine, a latch to

hold the stopping lever in operative position, an electromagnet to disengage the latch and release the stopping lever, a normally open electric circuit including a magnet, and devices actuated by the movement of the tone arm to close the circuit and thereby to energize the magnet and release the stopping lever and break the circuit.

3. In a talking machine, the combination of a motor, a turn table, a brake lever for the motor, a stopping lever normally free of the brake lever but adapted to actuate the same to stop the machine, a latch to hold the stopping lever in inoperative position, an electromagnet to disengage the latch and release the stopping lever, a normally open electric circuit including a magnet, a tone arm, a contact terminal carried by the tone arm, and a second terminal with which the first terminal is brought into contact by the movement of the tone arm.

4. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, devices carried by the swinging arm to cooperate with the record disk and move the swinging arm automatically to a predetermined position and means for stopping the motor, the operation of which is initiated by contact of the tone arm with the swinging arm.

5. In a talking machine, the combination of a motor, a turn table driven thereby, stopping devices for the motor, a tone arm, an electromagnet to control the stopping devices, an electric circuit including the magnet and a source of electric energy, a terminal contact carried with the tone arm, a contact arm constituting the other terminal and provided with a contact face of such form as to be engaged by the terminal on the tone arm only when the two arms are in predetermined relative positions and devices carried by the contact arm to cooperate with the record disk and move the swinging arm automatically to such predetermined position.

6. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact with the swinging arm, and means adapted to be engaged by the tone arm for moving the swinging arm automatically away from the record grooves when the latter is to be removed from the turn table.

7. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact of the tone

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arm with the swinging arm, and means adapted to be engaged by the tone arm for raising the swinging arm automatically from the face of the record disk when the latter is to be removed and simultaneously moving the swinging arm to an initial predetermined position with respect to the record disk to be played.

8. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact of the tone arm with the swinging arm; a movable support to hold the tone arm in raised position and means operatively connected to said support and actuated by the engagement of the tone arm therewith for raising the swinging arm automatically from the face of the disk.

9. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact of the tone arm with the swinging arm, a vertically disposed movable support provided with a hook adapted to be engaged by the tone arm in raised position, a lever with which the support is engaged, and a second vertically disposed movable support for the swinging arm engaged with the other end of the lever, whereby depression of the first named support raises the second named support with the swinging arm.

10. In a talking machine, the combination of a motor, a turn table driven thereby, a tone arm, an independent swinging arm pivoted at a distance from the tone arm, means for stopping the motor, the operation of which is initiated by contact of the tone arm with the swinging arm, a vertically disposed movable support provided with a hook adapted to be engaged by the tone arm

in raised position, a lever with which the support is engaged, and a second vertically disposed movable support for the swinging arm engaged with the other end of the lever, a fork formed on the other end of the second named support to receive the swinging arm and provided with a cam surface for engagement with the swinging arm, whereby when the second named support is raised, the swinging arm is raised from the face of the record disk and simultaneously swung to an initial predetermined position with respect to the record to be played.

11. In a phonograph, a finder arm movable to operative position by centrifugal force upon rotation of the disk and means to throw said finder arm to initial position toward the center of the record.

12. In a phonograph, in combination with the tone arm, a finder arm movable automatically under the action of centrifugal force into operative position upon rotation of the record disk and means operable by the tone arm for raising the finder arm and moving it automatically into initial position toward the center of the record in readiness for playing.

13. In a phonograph, an automatic finder arm and means controlled by the finder arm for stopping the record disk, said finder arm being movable automatically from any part of the record to a position to effect the stoppage at the end of the record.

14. In a phonograph, a spring tensioned electrified tone arm tensioned toward the beginning of a playing record, an electrified opposing spring tensioned finder arm tensioned toward the end of a player record and adapted to be positioned by the revolving of the record to contact with the tone arm at a predetermined time, and a controlling circuit closed by such contact to stop the record.

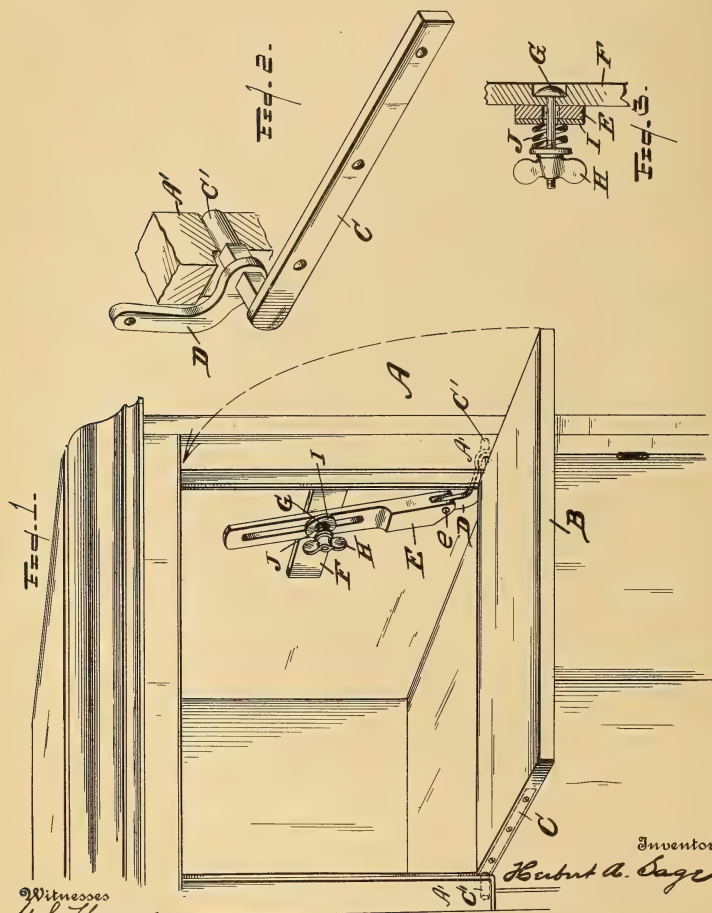
This specification signed this 23d day of June A. D., 1916.

JOHN A. WESER.

H. A. SAGE.
TONE MODULATING SHUTTER FOR PHONOGRAPH CABINETS.
APPLICATION FILED MAR. 6, 1916.

1,232,094.

Patented July 3, 1917.



Witnesses
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UNITED STATES PATENT OFFICE.

HERBERT A. SAGE, OF DETROIT, MICHIGAN.

TONE-MODULATING SHUTTER FOR PHONOGRAPH-CABINETS.

1,232,094.

Specification of Letters Patent.

Patented July 3, 1917.

Application filed March 6, 1916. Serial No. 82,279.

To all whom it may concern:

Be it known that I, HERBERT A. SAGE, citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful improvement in Tone-Modulating Shutters for Phonograph Cabinets, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to a tone modulating shutter for phonograph cabinets, shown in the accompanying drawings and more particularly set forth in the following specification and claims.

The object of my invention is to provide a tone modulating shutter adapted for adjustment to any degree of opening between its closed and maximum open position;—it being automatically held in any desired adjusted position.

A further object of the invention is to so adapt the shutter that when fully open, it may serve as a shelf to receive records while transferring or replacing them upon the revolving table of the phonograph.

Another feature of the invention is the automatic gripping device to secure the shutter in its several adjusted positions.

Other advantages and improvements will hereafter appear.

In the drawings accompanying this specification:—

Figure 1 is a fragmentary perspective view of a phonograph cabinet showing the modulating shutter in its open position for use as a record shelf. The arrow indicates the arc of its travel when adjusting it to regulate its tone.

Fig. 2 is a perspective view of the rocker arm and shelf supporting bracket, indicating a fragment of the cabinet frame in which the device is journaled.

Fig. 3 is a detail sectional view through the adjustable bar connected with the rocker arm, and the resilient means for yieldingly securing it in its adjusted position.

Referring now to the letters of reference placed upon the drawings:—

A, denotes a phonograph cabinet with the horn and motor mechanism removed. B, indicates a swinging shutter. C, denotes a metallic strip inserted in the edge of the

shutter at each end having a projecting stub shaft C', journaled in the frame A', of the cabinet.

D, denotes a rocker arm mounted on one of the stub shafts C', which is there squared to receive it. E, is a slotted bar pivoted at e, to the rocker arm.

F, designates a strip secured to the side wall of the cabinet, through which projects a bolt G, engaged by a thumb nut H.

I, is a washer encircling the bolt adjacent to the slotted bar E. J, is a spring sleeved upon the bolt, one end of which bears against the thumb nut H,—the other end being in contact with the washer:—the purpose of the spring being to force the slotted bar into frictional locking relation with the strip F, secured to the cabinet, that it may yieldingly maintain the shutter in any adjusted position.

The tone modulating shutter B, may if desired be provided with a suitable lock to secure it in its closed position to keep children and others from meddling with the instrument. When the shutter is in its open position, it is adapted for use as a shelf to receive the records while removing or replacing the records upon the revolving table of the phonograph.

To insure the shutter being supported rigidly in its open position—as when used as a shelf—and to limit the further opening of the same, the rocker arm D, is so positioned with reference to the frame of the cabinet that its vertical arm bears against the frame;—as will be readily understood upon reference to Fig. 2.

Having thus described my invention, what I claim is:—

1. In a device of the character described, a cabinet, a swinging shutter, a metallic strip secured to each end of the shutter having stub shafts journaled in the frame of the cabinet, a rocker arm secured to one of the stub shafts and extending at right angles thereto, a strip secured to the inner side wall of the cabinet, a bolt extending through said strip and fastened in the cabinet, a thumb-nut screwed on said bolt, a bar pivoted to the rocker arm and provided with an elongated slot, through which said bolt extends, said bar being slidable on said bolt, and a spring interposed on said bolt between said bar and said thumb-nut, whereby the shutter is frictionally held in a position to which it may be adjusted.

2. In a device of the character described, a cabinet, a swinging shutter, a metallic strip secured to each end of the shutter having projecting stub shafts journaled in the
5 frame of the cabinet, a rocker arm secured to one of the stub shafts and extending at right angles thereto, said rocker arm being so positioned with reference to the frame of the cabinet that it may contact therewith to
10 serve as a support for the shutter when opened to its limit, and means connected to

said rocker arm and located within the cabinet for frictionally holding the said shutter in any position to which it may be adjusted.

In testimony whereof, I sign this specification in the presence of two witnesses.

HERBERT A. SAGE.

Witnesses:

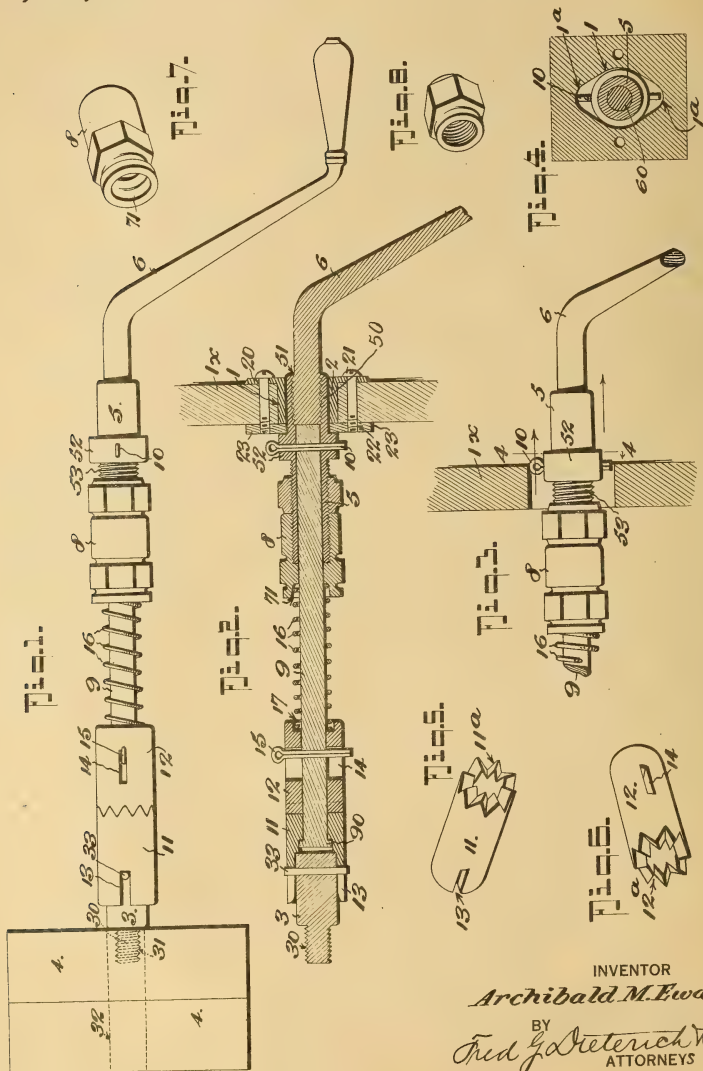
S. E. THOMAS,
J. L. DUFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

A. M. EWART.
MOTOR WINDING CRANK.
APPLICATION FILED MAR. 30, 1917.

1,232,779.

Patented July 10, 1917.



INVENTOR
Archibald M. Ewart
BY *Fred Goetters*
ATTORNEYS

UNITED STATES PATENT OFFICE.

ARCHIBALD M. EWART, OF BARBERTON, OHIO.

MOTOR-WINDING CRANK.

1,232,779.

Specification of Letters Patent.

Patented July 10, 1917.

Application filed March 30, 1917. Serial No. 158,684.

To all whom it may concern:

Be it known that I, ARCHIBALD M. EWART, residing at Barberton, in the county of Summit and State of Ohio, have invented a new and Improved Motor-Winding Crank, of which the following is a specification.

My invention has reference to improvements in winding cranks for talking machines and it primarily has for its object to provide an improved construction of crank mechanism of the character stated in which is included a safety device designed for preventing the over winding of the spring and the straining and breaking of the said spring.

My invention also has for its purpose to provide a cranking mechanism of a simple and economical construction, in which the parts are especially designed for being readily applied for use on all classes of talking machines, that can be applied without any material change in the usual way of connecting the winding crank to the motor spring shaft, which can be bodily removed from the motor and the talking machine casing, so that the motor may be elevated for oiling and adjusting, and which effectively serves its intended purpose.

With other objects in view and herein-after explained, my invention embodies the peculiar construction and combination of the parts set out in the following description, specifically pointed out in the appended claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of my spring motor winding crank mechanism.

Fig. 2 is a longitudinal section thereof.

Fig. 3 is a plan view of a portion thereof and illustrates the manner it is withdrawn through the casing.

Fig. 4 is a transverse section taken on the line 4—4 and looking in the direction of the arrow.

Fig. 5 is a perspective view of one of the safety clutch members.

Fig. 6 is a similar view of the cooperating clutch member.

Fig. 7 is a detail perspective view of the spring tension adjusting nut, and

Fig. 8 is a similar view of the clamp nut that coöperates therewith.

In the practical application of my invention, I form the aperture 1, in the side wall 1^a of the casing, with oppositely disposed lateral extensions 1^a—1^a, the reason for which will presently appear, and mount within the said aperture a hub-like bearing 2 formed on an escutcheon plate 20 secured to the side of the casing by machine screws 21 which engage threaded apertures 22 in a plate 23 secured to the inner side of the casing, as shown.

3 indicates a plug formed with an externally threaded end 30 that screws into the threaded socket 31 in the motor spring shaft 32, to which the motor springs 4—4 are secured in the usual way.

5 designates a sleeve that includes a hub portion 50 formed with an internally threaded portion 51 for receiving the threaded end 60 of the crank handle 6, and the said hub portion 50 has a collar 52 for bearing against the inner end of the hub bearing 23 as is clearly shown in Fig. 2, by reference to which it will also be seen sleeve 5 includes a long externally threaded bearing 53 on which is mounted an adjusting nut and a jam nut 8, the outer end of the adjusting nut having a socket 71, as shown.

9 represents a steel shaft, one end of which extends into sleeve 5 and is made fast to the said sleeve by a cotter pin 10 that passes through the hub end of the sleeve and the shaft 9.

11 and 12 are inner and outer clutch members having slip clutch engaging faces 11^a—12^a.

The outer clutch member 11 has an end socket for slipping onto the plug 3 that is attached to the spring motor shaft and diametrically oppositely elongated slots 13—13 for receiving the ends of a cross pin 33 on the outer end of the plug, as shown.

The inner clutch member 12 has an elongated cross slot 14 for receiving a cotter pin 15 which passes through the steel shaft 9.

16 indicates a coil tension spring mounted on the crank shaft, one end of which seats in the socket 71 of the adjusting nut 7 and

the other end seats in a like socket 17 on the inner end of the clutch member 12.

The outer end of shaft 9 has a head portion 90 that prevents the clutch members 11—12 slipping beyond the inner end of the said shaft 9 when adjusting the parts to the operative position.

From the foregoing description taken in connection with the drawing, the complete construction, the manner of operation and the advantages of my invention will be readily understood.

By reason of providing a long bearing sleeve mounted at one end in the side of the casing and providing a plug bearing 3 that forms, as it were, a fixed part of the spring motor shaft, a substantially rigid mounting is provided for the operating parts, which, when the escutcheon with its hub is removed from the casing, may be bodily pulled out through the casing side, by holding the same with the cotter pins in position to align the lateral extensions of the aperture in the casing end and are as readily shoved back through the said aperture to connect with the plug bar 3.

It is obvious that by coöperatively combining the several parts that constitute the operating mechanism, in the manner shown and described, the entire mechanism can be conveniently disconnected from the motor, when it is desired to elevate the motor for oiling, and can be as readily reapplied when the motor is put back in the operative position.

The tension on the slip clutch members 11—12 can be readily adjusted to suit the desired requirements by proper adjustment of the nut 8.

My construction of crank mechanism is such that it is adapted for use on all classes of talking machines and when the clutch members are assembled in the operative position, they form a part of the winding handle.

The crank handle proper can be removed at any time without removing the other coöperative parts, by simply unscrewing it from the head end of the sleeve.

What I claim is:

1. A spring motor winding crank mechanism that comprises in combination with the motor shaft and a supporting element having an aperture in axial alinement with the said motor shaft, a crank shaft, a pair of slip clutch engaging members, one of which turns with the crank shaft, the other of which turns loosely on the said crank shaft, the said latter shaft having means for interlocking with the motor shaft when it is pushed endwise through the aperture in the support, tension means mounted on the crank shaft for holding the clutch members in frictional engagement and means for hold-

ing the crank shaft from endwise movement when operatively connected with the motor shaft.

2. A winding crank mechanism for talking machines comprising in combination with the machine casing and the spring motor, said motor including a laterally extended plug attached to the motor spring shaft, the casing having an aperture in axial alinement with the said motor shaft plug; a crank shaft, slip clutch devices mounted on the shaft, a spring tension that engages and holds the clutch devices in frictional engagement, means on the inner end of the crank shaft for interlocking with the motor shaft stud, said crank shaft and its friction clutch devices being bodily endwise movable through the aperture in the machine casing, and means for locking the crank shaft to its operative adjustment, said means comprising an escutcheon plate having a hub that extends into the casing aperture and forms a bearing for the shaft.

3. As a new article, a winding crank mechanism for talking machines comprising a plug adapted for being fixedly attached to one end of the spring motor shaft, a crank actuated shaft, a pair of coöperating friction clutch members on the shaft, one of the said members being keyed to the shaft to turn therewith, the other clutch member and the motor shaft engaging plug having slidably engaged interlocking means, a spring on the shaft for holding the clutch members in operative engagement, a sleeve mounted on the outer end of the crank shaft, said sleeve including a bearing hub for extending into the winding crank shaft receiving aperture of the talking machine casing, means for holding the said crank shaft from endwise movement when applied to its operative position, and adjusting devices on the crank shaft for regulating the tension of the spring.

4. A motor spring winding mechanism for talking machines bodily endwise movable through the usual winding crank shaft aperture in the machine casing, said mechanism including a lug bearing having a threaded end for engaging a threaded socket in the motor shaft, a crank shaft, a sleeve keyed on one end thereof, said sleeve including a hub member that extends beyond the outer end of the crank shaft and is adapted for fitting into the casing aperture, the said hub having a threaded socket for receiving the threaded end of a crank handle, said hub including a stop shoulder, an escutcheon plate for the casing aperture, said plate having a hub that fits the aperture and is engaged by the shoulder on the sleeve hub, the sleeve on the shaft including an externally threaded portion, an adjusting screw nut and a lock screw nut mounted on the thread-

ed end of the sleeve, a pair of interengaging slip clutch members loosely mounted on the outer end of the crank shaft, the inner one of the said clutch members having an elongated cross slot, a key that passes through the said slot and the shaft, a tension spring on the shaft that engages the said inner clutch member and the adjusting screw, the outer clutch member and the shaft plug having interlockable members that engage when the crank winding mechanism is inserted through the casing aperture and is moved into contact with the said shaft plug.

ARCHIBALD M. EWART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



J. JONASSON.

TONE ARM.

APPLICATION FILED JAN. 6, 1917.

1,232,807.

Patented July 10, 1917.

Fig. 3.

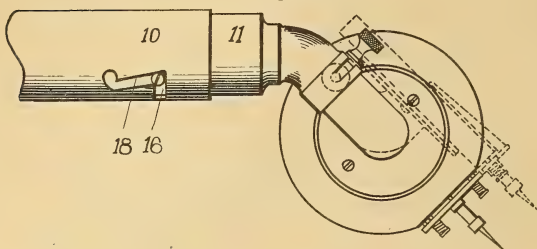


Fig. 2.

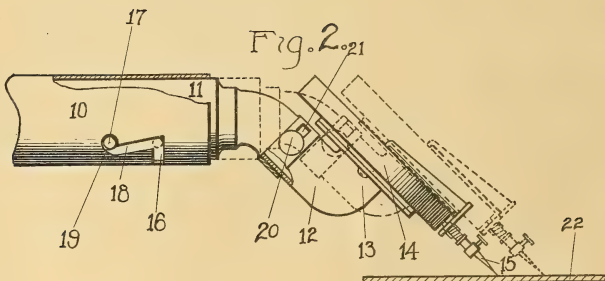
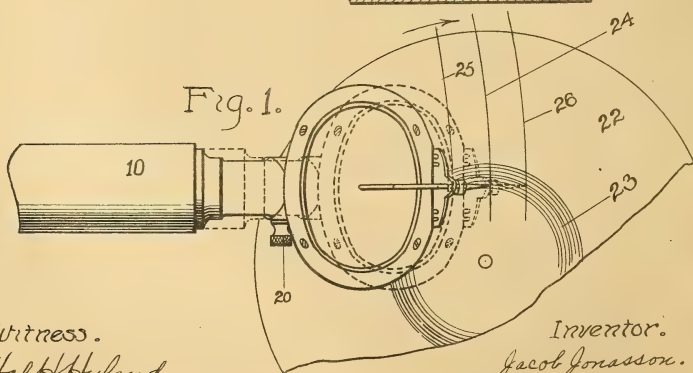


Fig. 1.



Witness.
Halt Hyland.

Inventor.
Jacob Jonasson.
By Enig & Bain Attys.

UNITED STATES PATENT OFFICE.

JACOB JONASSON, OF DES MOINES, IOWA.

— TONE-ARM. —

1,232,807.

Specification of Letters Patent.

Patented July 10, 1917.

Application filed January 6, 1917. Serial No. 140,962.

To all whom it may concern:

Be it known that I, JACOB JONASSON, a citizen of the United States, and resident of Des Moines, in the county of Polk and State of Iowa, have invented a certain new and useful Tone-Arm, of which the following is a specification.

The object of my invention is to provide an adjustable tone arm of simple and inexpensive construction for carrying the sound box of a talking machine.

A further object is to provide such a tone arm having adjustable means for supporting the sound box which carries the stylus, capable of adjustment, so that the device may be used for playing either type of record, whether the sound grooves are of the kind having the up and down waves or the kind having the lateral waves, so that in using either record the record will be carried past the stylus with the groove traveling in a path at the point where the stylus engages it, which is radial of the circle on which the stylus swings, so that the stylus will not drag against the side of the groove.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 shows a top or plan view of my improved tone arm, the dotted lines showing the sound box in its adjusted position.

Fig. 2 shows a side elevation of the same, the full lines showing the sound box in one of its adjusted positions, and the dotted lines showing it in another position, and

Fig. 3 shows a side elevation of the tone arm with the sound box adjusted for use with a different type of record, the dotted lines showing the sound box in an adjusted position.

It may be explained in a preliminary way that there are a number of tone arms having the sound box adjustably mounted thereon, on a sort of crank arm for adjustment to positions for playing either of the common types of records. The difficulty involved in the use of such an adjustable tone arm arises from the fact that if the tone arm is properly adjusted for use with one type of record, then when it is swung on its crank arm support a quarter revolution, the stylus, instead of traveling smoothly in the groove of the

record, will tend to drag against the side thereof. This difficulty I have sought to solve by my construction herein shown.

In the accompanying drawings, I have used the reference numeral 10 to indicate generally a tubular arm forming part of my improved tone arm. Slidably and rotatably mounted in the end of the tube 10 is a tubular tone arm member 11 having at its forward end a portion 12, which in one position of the device, extends downwardly and away from the tubular member 10.

At the lower end of the extension 12 is a portion 13 extending upwardly and away from the portion 12 at substantially right-angles thereto, and supporting an ordinary sound box 14, which carries the stylus or needle 15.

Formed in the tubular member 10 is a circumferentially elongated slot 16. Extending rearwardly and slightly downwardly from the slot 16 is a slot 18 at the rear end of which is an upward extension 19 on the horizontal level with the upper end of the slot 16.

The portion 12 is made of two parts telescopically connected, the lower portion being capable of limited rotary motion with relation to the upper portion. The lower portion is provided with a pin 20 which travels in a circumferentially elongated slot 21 in the upper portion to permit a quarter revolution of the lower portion of the part 12 with relation to the upper portion thereof.

In Fig. 1, I have shown a record disk 22, having the sound grooves 23.

It will be understood that in ordinary talking machines, the tone arm may be swung horizontally and in Fig. 1, I have shown the line 24 to indicate the arc of a circle on which the stylus 15 travels during such horizontal swinging movement of the tone arm.

In this connection it may be stated that the tone arm and stylus should be so constructed and arranged and located with relation to the record disk 22 that the sound groove 23, in which the stylus is traveling, will at the point where the stylus is located, always be traveling substantially in a line radially of the circle of which the line 24 forms an arc. When this construction is followed, the stylus will never drag against the side of the sound groove. The line 24 passes through the center of the disk.

Records are made generally of two types

in which the sound groove has up and down waves or lateral waves. It is desirable that tone arms be supplied with which either record may be played.

- 5 This can be accomplished by rotating the lower portion of the member 12 a quarter of a revolution, the tone arm being then designed in one position of its movement to play one style of record and in another position to play the other style of record. This movement is provided in my device by means of the two part construction of the member 12. The member 11 is permitted rotary movement in the member 10 for lifting the sound box away from the disk.

10 When the tone arm is operated, so that the stylus is in proper position with relation for properly playing one type of disk, it will be seen that when a quarter turn is given to the sound box in the lower portion of the member 12, the stylus, instead of being then in the proper position with relation to the grooves of the record, will be in position so that it tends to drag against the side of the sound wave groove.

25 In Fig. 1, I have shown in full lines a stylus in proper position for playing the record having the up and down sound wave grooves.

30 If then it is desired to play records having the other type of grooves, and the lower part of the member 12 is turned a quarter revolution, it will be seen that the stylus would then be in the line 25 and would tend to drag against the side of the groove. If the tone arm were adjusted or constructed so that when in the position shown in Fig. 3, the stylus would be located in a line 24, then if the portion 12 were given a quarter turn, bringing the sound box to the positions shown in Figs. 1 and 2, the stylus would be in the line 26 and would tend to drag against the side of the sound box.

45 I have, therefore, constructed my tone arm, as shown, so that when the sound box is given a quarter turn from the position shown in Fig. 1, to the position shown in Fig. 3, the member 11 may be pushed outwardly from its positions shown in Figs. 1 and 2 to position shown in Fig. 3, so that the stylus may, in both positions of the sound box, and for playing both styles of records, be in the line 24. The extension 19 serves to lock the member 11 against longitudinal sliding movement during the operation of the machine.

55 My improved device is of extremely simple construction and permits the location of the stylus at all times in proper position with relation to the record.

Some changes may be made in the construction and arrangement of my improved

device, without departing from the essential features and purposes of my invention, and it is my intention to cover by my present application any such changes in construction or use of mechanical equivalents which may be included within the reasonable scope of the claims of my patent.

I claim as my invention:

1. In a device of the class described, a tubular, two part tone arm having the forward portion telescopically received within the rearward portion, the rearward portion having an L shaped slot therein with an engaging notch at the rear end of the longitudinal arm of said slot, a pin mounted on the forward portion of said arm and adapted to coact with said slot whereby the movable portion of the tone arm may be moved longitudinally between two predetermined positions and may also be rotated relative to the stationary portion of the tone arm.

2. In a device of the class described, a horizontally disposed tube adapted to form a part of a tone arm having a substantially L shaped slot therein, the longitudinal portion of the slot having an engaging notch at one end and being inclined upwardly from said notch, a second tube adapted to be telescopically received in the first, and a pin fixed in the last tube and adapted to be received in the slot in the first tube whereby the second tube may be permitted longitudinal movement relative to the first tube between two predetermined limits and rotary movement from one of its longitudinal positions.

3. In a playing arm having a reproducing mechanism thereon adapted to cooperate with records of both the undulating and lateral wave types, a fixed tube having a longitudinal slot therein inclined upwardly toward the free end and provided at its other end with an upwardly extending notch, the upper end of the longitudinal slot being extended circumferentially of the tube whereby the two ends of the longitudinal portion of the slot are adapted to cooperate with a pin to lock the pin in position, a second tube adapted to be slidably and rotatably received within the first tube and to have the reproducing mechanism secured to its free end, and a pin extended outwardly from the surface of the second tube adapted to be received within said slot whereby movement of the second tube within the first may be limited to longitudinal reciprocation between two predetermined positions and rotary movement when the pin is at a position adjacent to the upper end of the longitudinal portion of the slot.

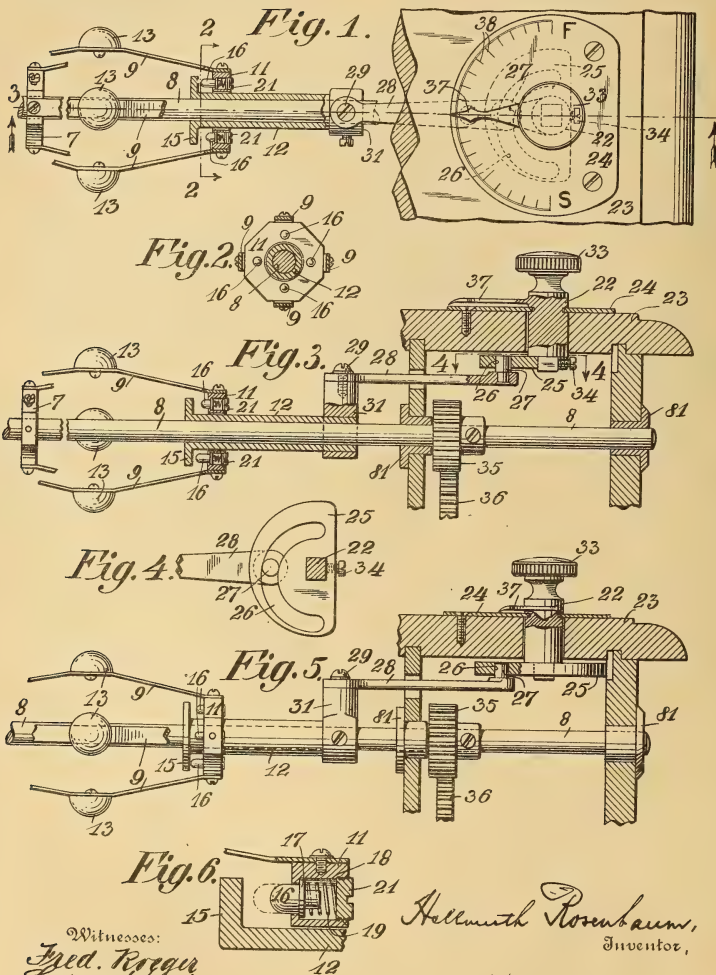
Des Moines, Iowa, December 26, 1916.

JACOB JONASSON.

H. ROSENBAUM.
SPEED REGULATING DEVICE.
APPLICATION FILED FEB. 9, 1917.

1,232,848.

Patented July 10, 1917.



Witnesses:
Fred. Koenig
Louis Keller

Hellmuth Rosenbaum,
Inventor,

By *Henry Schreiter* his Attorney

UNITED STATES PATENT OFFICE.

HELLMUTH ROSENBAUM, OF BROOKLYN, NEW YORK. ASSIGNOR TO EMILY H. ALLEN, OF BROOKLYN, NEW YORK.

SPEED-REGULATING DEVICE.

1,232,848.

Specification of Letters Patent.

Patented July 10, 1917.

Application filed February 9, 1917. Serial No. 147,597.

To all whom it may concern:

Be it known that I, HELLMUTH ROSENBAUM, a citizen of Germany, and resident of the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Speed-Regulating Devices, of which the following is a full, clear, and complete specification.

10 Devices for regulating the speed of the driving mechanism for talking machines need to be constructed to operate effectively when the speed, by which the record disk is to be rotated, is increased or reduced to correspond to the character of the musical compositions, songs, etc., which are to be reproduced.

With this object in view, I have devised the speed regulating mechanism shown in the accompanying drawings, wherein—

20 Figure 1 is a plan view, partly sectional view, of a speed regulating device constructed according to my invention;

25 Fig. 2 is a sectional view on line 2—2 and Fig. 3 a sectional view on line 3—3, indicated in Fig. 1;

Fig. 4 is a detail, plan view of the part on line 4—4, indicated in Fig. 3;

30 Fig. 5 is a sectional view, partly elevation, similar to Fig. 3, but showing the parts of the speed regulating mechanism in the positions when the mechanism is set to operate at a lower than the normal speed.

35 Fig. 6 is a detail of the speed regulating mechanism.

In these drawings the numeral 7 designates a collar fixed to the shaft 8, journaled in the usual way in bearings, as shown at 81, in the walls of the box of the talking machine, and whereon also the flanged sleeve 12 is mounted. This shaft 8 might be the shaft whereon the gear rotating the record disk (not shown in the drawings) is mounted, or an intermediate shaft, and is 40 operatively connected with the driving shaft of the machine by the gears 35 and 36. The collar 11 is loosely mounted on the sleeve 12, and is connected by the flexible springs 9 to the collar 7. A series of friction plugs 16 is arranged in the collar 11 to project against the flange 15 of the sleeve 12.

They vary in length and are set in the flanged bores 18 in the collar 11, their flanges 17 holding them therein and also against the springs 19, set on their stems, 55 between the flanges 17 and the plugs 21, to press them outwardly, though permitting their being pushed in under slight pressure. Their constructions, and also the manner of their setting in the collar 11, are shown 60 in enlarged detail in Fig. 6. The frictional contact of the plugs 16 with the flange 15 tends to reduce the speed of the shaft 8. Four of these friction plugs 16 are shown in Fig. 2 to be set in the collar 11. The purpose of making these friction plugs 65 unequally long is to effect a gradually increasing frictional contact between these plugs 16 and the flange 15 of the sleeve 12, whereby the effectiveness of the speed regulating 70 device is increased.

The weights 13 are affixed to the springs 9, approximately midway between their ends. Their action on the springs 9 tends to move the collar 11 toward the flange 15 75 of the sleeve 12, correspondingly to the speed by which the shaft 8 is rotated. Thereby the friction plugs 16, set in the collar 11, are successively brought in contact with the flange 15, when the shaft 8 rotates at a 80 higher speed than desired.

For the purpose of enabling this speed regulating device to operate at the variable speeds as the playing of different musical compositions, or songs, requires, the sleeve 85 12 is made longitudinally movable on the shaft 8, and mechanism is provided for shifting it nearer to, or farther away, from the normal position of the collar 11. This mechanism is constructed as follows: 90

The stud 22 is set turnably in the top plate 23 of the box of the talking machine and is secured thereto by plate 24. The plate 25 is secured to the squared lower end of stud 22 by the set screw 34. The pin 27, set in 95 the end of the link 28, engages in the eccentric slot 26 made in plate 25, as shown in Fig. 4. The other end of link 28 is connected by screw 29 to the bracket 31, secured to the sleeve 12. The upper end of 100 the stud 22 is formed into a knob 33, or a handle may be screwed thereon, to facilitate

turning it, whereby the plate 25 is swung around with the stud 22 for its axis. The engagement of the pin 27 in the eccentric slot 26 causes the link 28 to shift the sleeve 12 along the shaft 8 nearer to, or farther from, the fixed collar 7 according to the direction in which the stud 22 is turned. The slot 26 is so eccentric relatively to the stud 22, that by turning the stud 22 from left to right the sleeve 12 is moved toward the fixed collar 7, whereby its flange 15 is removed farther from the friction plugs 16, whereas by turning the stud in the opposite direction, that is, from right to left, the flange 15 is brought nearer to the collar 11, and in close proximity to the longest of the friction plugs 16, projecting therefrom. Consequently, when the stud 22 is turned to the right, the plugs 16 are not brought in frictional contact with the flange 15 until the speed, by which the shaft 8 is rotated, causes the weights 13 to draw out the flexible springs 9 sufficiently to move the collar 11 the thus increased distance toward the flange 15. And again, when the stud 22 is turned to the left the flange 15 is brought nearer to the collar 11, and the longest of the plugs 16 is brought in frictional contact with it almost immediately when the driving mechanism of the talking machine is started. Thus the speed regulating device is made to maintain a uniform, faster or slower speed, at which the record disk is desired to be rotated, by correspondingly turning the stud 22, as explained. To facilitate the adjustment of the speed regulating device to whatever speed is desired, the pointer 37 is set on the stud 22 and a graduated scale 38 is engraved on the plate 24, over which the pointer 37 travels, when the stud 22 is turned. This scale 38 may be graduated in any desired way, and the letters S and F may be engraved on the ends of the scale, as shown in Fig. 1, to indicate the direction, in which the stud 22 is to be turned when a slower or a faster rotating of the record disk is desired.

I claim as my invention:

1. A speed regulating device for driving mechanism of talking machines, comprising a shaft operatively connected with the driving mechanism; a collar fixed to the shaft; a flanged sleeve on the shaft and longitudinally movable thereon; a collar, loosely mounted on the sleeve and longitudinally movable thereon; friction plugs yieldingly set in the movable collar in position to engage the flange of the sleeve; flexible links connecting the fixed and the movable collar; weights secured to the links approximately midway between their ends, and means for shifting the sleeve on the shaft; substantially as herein shown and described.

2. A speed regulating device for driving

mechanism of talking machines, comprising a shaft operatively connected with the driving mechanism; a collar fixed to the shaft; a flanged sleeve on the shaft and longitudinally movable thereon; a collar, loosely mounted on the sleeve and longitudinally movable thereon; friction plugs of different lengths set yieldingly in the movable collar in position to engage the flange of the sleeve; flexible links connecting the fixed and the movable collar; weights secured to the links approximately midway between their ends, and means for shifting the sleeve on the shaft; substantially as herein shown and described.

3. A speed regulating device for driving mechanism of talking machines, comprising a shaft operatively connected with the driving mechanism; a collar fixed to the shaft; a flanged sleeve on the shaft and longitudinally movable thereon; a collar, loosely mounted on the sleeve and longitudinally movable thereon; friction plugs set in the movable collar in position to engage the flange of the sleeve; flexible links connecting the fixed and the movable collar; weights secured to the links approximately midway between their ends; a stud turnably mounted in the top plate of the talking machine; and means, operatively connecting the stud with the movable sleeve, for moving the sleeve by turning the stud; substantially as herein shown and described.

4. A speed regulating device for driving mechanism of talking machines, comprising a shaft operatively connected with the driving mechanism; a collar fixed to the shaft; a flanged sleeve on the shaft and longitudinally movable thereon; a collar, loosely mounted on the sleeve and longitudinally movable thereon; friction plugs set in the movable collar in position to engage the flange of the sleeve; flexible links connecting the fixed and the movable collar; weights secured to the links approximately midway between their ends; a stud turnably mounted in the top plate of the talking machine; an eccentrically slotted plate, secured to the stud; a link having one end secured to the sleeve and a pin, engaging in the eccentric slot of the plate, set in the other end, and means for turning the stud; substantially as herein shown and described.

5. A speed regulating device for driving mechanism of talking machines, comprising a shaft operatively connected with the driving mechanism; a collar fixed to the shaft; a flanged sleeve on the shaft and longitudinally movable thereon; a collar, loosely mounted on the sleeve and longitudinally movable thereon; friction plugs set in the movable collar in position to engage the flange of the sleeve; flexible links connecting the fixed and the movable collar; weights

secured to the links approximately midway between their ends; a stud turnably mounted in the top plate of the talking machine; a pointer on the stud; a graduated scale on the top plate of the talking machine, in position to be traversed by the pointer when the stud is turned, and means, operatively

connecting the stud with the movable sleeve, for moving the sleeve by turning the stud; substantially as herein shown and described. 10

HELLMUTH ROSENBAUM.

Witnesses:

PAULA BATES,
LOUISE KOLLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

L. P. JACKSON.
SOUND REPRODUCING MACHINE.
APPLICATION FILED JULY 3, 1912.

1,232,924.

Patented July 10, 1917.
2 SHEETS—SHEET 1.

Fig. 1.

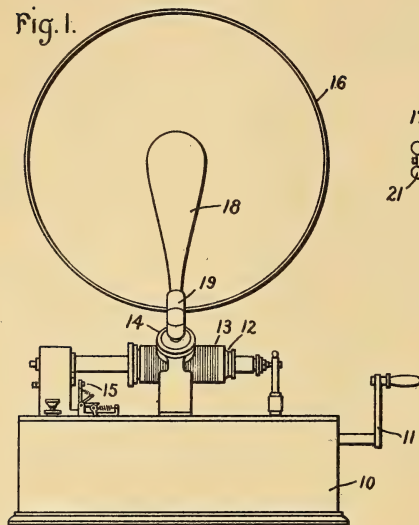


Fig. 2.

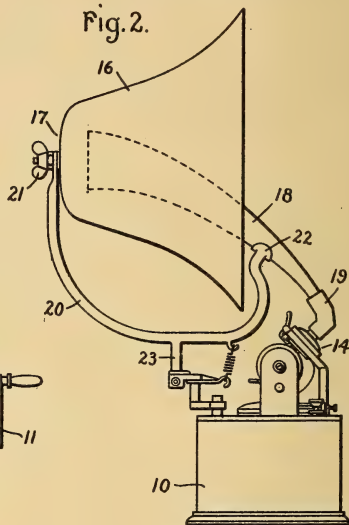


Fig. 3.

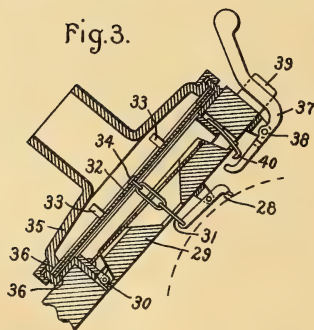
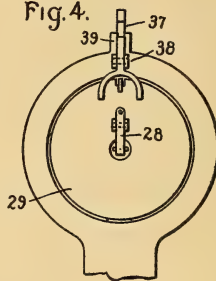


Fig. 4.



Witnesses
J. E. Allen
Marion C. Byng

Inventor
Louis P. Jackson
by *Frank J. Abbott*
Atty.

1,232,924.

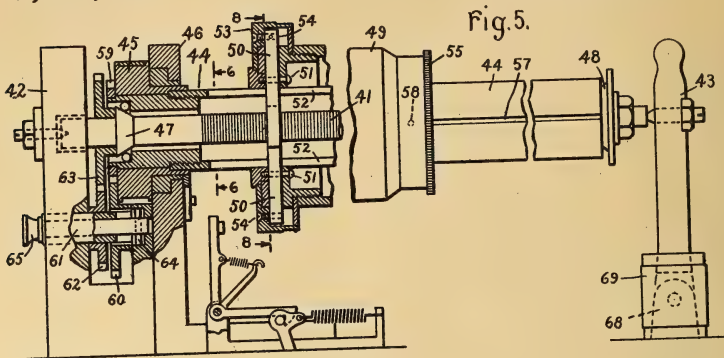


Fig. 6.

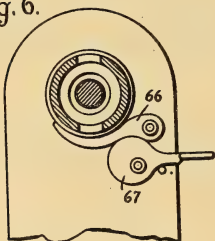


Fig. 7.

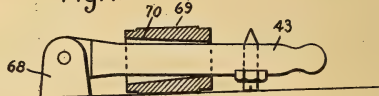


Fig. 9.

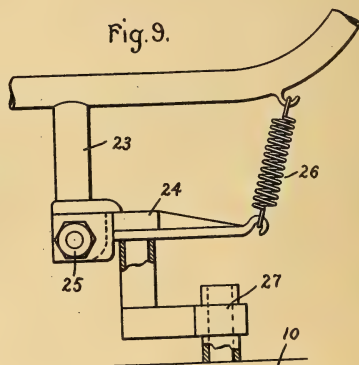
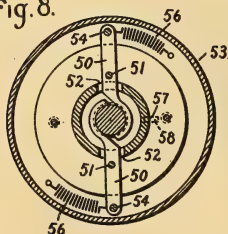


Fig. 8.



Witnesses
J. E. E. E.
Marion L. R. R.

Inventor.
Louis P. Jackson
by *Charles J. Abbott*
Att'y.

UNITED STATES PATENT OFFICE.

LOUIS P. JACKSON, OF SCHENECTADY, NEW YORK.

SOUND-REPRODUCING MACHINE.

1,232,924.

Specification of Letters Patent.

Patented July 10, 1917.

Application filed July 5, 1912. Serial No. 707,889.

To all whom it may concern:

Be it known that I, LOUIS P. JACKSON, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Sound-Reproducing Machines, of which the following is a specification.

This invention relates to improvements in sound reproducing machines and has for its object the provision of an improved machine of this character in which the distinctness with which the sound is reproduced is increased and which is more simple in construction and convenient of operation and adjustment than those heretofore known.

One of the objects of my invention is to provide an improved sound distributing means whereby the sound is reproduced in its original tones without the presence of disagreeable noises and is evenly diffused throughout the surrounding space. In one aspect my invention comprises an imperforate bell-shaped sound diffuser into the crown of which the sound is conveyed from the reproducer. By constructing the diffuser in this way and having the entire vibrating surface free to vibrate a remarkably even distribution of the sound is effected. In another aspect my invention comprises improvements in the reproducer consisting mainly in the provision of a diaphragm and other members of lignum vitae or similar material. Cushion members of chamois skin or the like are likewise provided, together with other improvements in the reproducer. Other features of my invention comprise improved speed varying means whereby the machine may be adjusted for records of different periods in addition to other features including an improved support for the cylinder. Other objects and purposes of my invention will appear in the course of the following specification in which I have shown my invention embodied in concrete form for purposes of illustration.

In the accompanying drawing illustrating my invention, Figure 1 is a front view of my complete machine; Fig. 2 is a side elevation thereof; Fig. 3 is a sectional view of my reproducer; Fig. 4 is a front view of the same; Fig. 5 is a side elevation partly in section of the cylinder and driving mechanism; and Figs. 6, 7, 8 and 9 are details of various parts.

Referring first to Figs. 1 and 2, 10 represents a box containing the driving mechanism (not shown) which is wound up by a crank 11. 12 is the cylinder on which is mounted the record 13. 14 is the reproducer. 15 represents a device for stopping the motor mechanism when the record reaches a predetermined position. One of the main features of my invention is shown in these figures and consists of the sound diffusing means. This means comprises a sound diffuser 16 which is bell shaped and is preferably made of thin metal, as for instance, brass or aluminum spun into the proper shape. This bell shaped diffuser is imperforate and has nothing in contact with it at any point to stop the vibrations except at the crown 17 where it is supported. By constructing the diffuser in this way it will vibrate just as a bell does so as to evenly distribute the sound throughout the surrounding space. The sound vibrations are delivered to the sound diffuser through a tube or horn 18 which is secured to the reproducer 14 in a well known manner by the elbow tube 19. This tube 18 is curved as shown and extends into the diffuser and terminates within a short distance of the crown of the diffuser. For supporting the tube and diffuser I provide a support 20 which is preferably tubular, one end of which is connected to the crown of the bell by a wing nut 21, while the opposite end is rigidly secured to the tube 18 at 22 by brazing or otherwise. This support is pivoted, as shown enlarged in Fig. 9, by means of a downward projection 23 mounted in the bracket 24. The projection is pivoted so as to move in the plane of the paper and a nut 25 is provided to lock the same in place. The support is also attached to the bracket 24 by a spring 26 by means of hooks on these two members so as to yieldingly hold the sound diffuser in position. The bracket 24 is pivoted in another bracket 27, which in turn is pivoted to the box 10. By this arrangement it will be seen that the sound vibrations from the reproducer are carried through the tube 18 and gradually expand until the diffusing bell is reached, whereupon the bell itself is set in vibration and the sound diffused by the bell in a well known manner. The advantage of having the bell imperforate and out of contact throughout its vibrating portion are obvious, since the

bell is thereby free to vibrate and sounds are therefore reproduced in a full and clear manner.

In Figs. 3 and 4 I have shown my improved reproducer. One of the main features of this reproducer consists in employing material such as lignum vitæ or the like, for constructing certain parts thereof. The construction of this reproducer will be clear from inspection of Figs. 3 and 4, in which it will be seen that the reproducing lever 28 is pivoted to a circular member 29 of metal such as brass or the like, which in turn is pivoted at 30. This member 29 has a conical opening therethrough through which the chain 31, consisting of two links, passes from the lever 28 to the diaphragm 32. This diaphragm is preferably of lignum vitæ or the like and is provided with two stops 33 for reducing or modifying the vibration of the diaphragm. I have selected lignum vitæ as the material for the diaphragm because of its peculiar qualities which fit it in a remarkable manner for this purpose. Moreover, it is unaffected by moisture and changes of temperature and retains its qualities indefinitely. The chain 31 is secured to the center of the diaphragm at 34 so that the vibrations of the lever will be transmitted to the diaphragm. A cover 35 to which the horn 18 is secured is likewise preferably made of lignum vitæ. The diaphragm is cushioned between the cover 35 and the frame of the reproducer by washers 36 of chamois skin or the like. This material I have found to be very satisfactory for this purpose, since it is soft and flexible and does not deteriorate with age. A lever 37, bent as shown, is pivoted at 38 so that its free end extends into proximity with the member 29 and the opposite end is adapted to be operated to lift the member 29 and therefore the reproducing lever out of engagement with the record. This lever is frictionally held in the clamp 39 so that it must remain in any position in which it is left by the operator. I also provide a hook-shaped finger 40 for supporting the member 29 when the reproducer is removed from the frame.

Referring now to Fig. 5 it will be seen that I have provided improved means for driving the cylinder and varying the speed thereof. As is well understood in the art, some records are of longer period than others. For instance, there are two minute records and four minute records. In order to cause the cylinder to travel at the proper rates corresponding to these different records without changing the speed of the motor I have provided the arrangement shown. It will be noted that in my machine the cylinder travels while the reproducer remains stationary. The cylinder is caused to travel by means of a screw 41 which ex-

tends between the supports 42 and 43 in which it is supported on centers. Surrounding the screw is the drum 44 which is driven by a pulley 45. This pulley is secured to the drum and has a bearing in the support 46. The drum likewise has a ball bearing on the conical end 47 of the screw and a similar bearing at 48. By driving the pulley the cylinder will be rotated on the bearings described. Mounted upon the drum 44 so as to slide longitudinally thereof is the cylinder 49. In order to rotate this cylinder and at the same time drive it longitudinally of the tube I provide the construction shown in Fig. 5 and shown in cross section in Fig. 8. This consists of two pivoted members 50 which engage the thread of the screw so as to constitute a nut which travels longitudinally of the screw when the latter is rotated. These members 50 are pivoted to the cylinder at 51 and extend through slots 52 in the drum. In order to disengage these members from the screw a circular cap 53 is arranged to rotate independently of the main body of the cylinder and the ends of the members are pivoted to this cap at 54. It will be seen from an inspection of Fig. 5 that if the cylinder is turned slightly by grasping the knurled portion 55 (Fig. 5) at the same time grasping the cap 53 the members 50 will be turned on their pivots 51 so as to move the threaded portions out of engagement with the thread of the screw. When the parts are released by the operator the springs 56 return the members to engaging position. The drum 44 is slotted at 57 to receive a pin 58 in the cylinder so as to positively drive it from the cylinder but permit it to travel longitudinally of the cylinder. By this arrangement it will be seen that when the pulley 45 is rotated, the drum 44 will be rotated and carry with it the cylinder and that the latter will be moved longitudinally of the drum by the engagement of the members 50 with the thread of the screw 41. In order to decrease the rate of longitudinal travel of the cylinder, I provide gearing which can be thrown into or out of operation at will for rotating the screw. It is obvious that if the screw is rotated in the same direction as the drum the longitudinal movement of the cylinder will be reduced, although the peripheral speed of the cylinder will remain the same. The gearing for accomplishing this purpose comprises a gear 59 which is secured to and always rotates with the drum and gearing from gear 59 to the screw, which gearing may be rendered operative or inoperative as desired. Gear 59 meshes with a gear 60 which rotates freely on sleeve 61. A gear 62 is secured to the sleeve 61 and meshes with a gear 63 secured to the screw 41. A clutch 64 operated by a sliding rod 65 is adapted to lock gear 60 to the sleeve 61

upon which it is mounted when the rod 65 is pulled outward. With the parts in the position shown in the drawing the gear 59 will drive the gear 60 which will merely
 5 turn loosely in its sleeve. If, however, the rod 65 is drawn outward the gear 60 will drive the sleeve which in turn will drive gears 62 and 63 and consequently the screw 41. The arrangement of gearing is such
 10 that the screw will be rotated in the same direction as the drum 44. This will obviously reduce the longitudinal travel of the cylinder 49 without changing its peripheral speed.

15 In Fig. 6 I have shown a brake for stopping the rotation of the cylinder. This consists of a pivoted brake sleeve 66 which is pressed into engagement with the drum by an eccentric lever 67. By pressing the lever
 20 the cylinder may be quickly stopped.

In Figs. 5 and 7 I have shown a convenient arrangement for removing the support for the cylinder to remove the record. This consists in pivoting the post 43 to a
 25 stationary part 68 so that it can be moved away from the drum. The post is locked in vertical position by a sleeve 69. The part 68 and the lower end of the post are tapered to correspond with the taper 70 in the inside
 30 of the sleeve. The tapered portions engage each other with a good fit so that by merely lifting the post to a vertical position from the position shown in Fig. 7 the sleeve will drop over the joint and lock the post tightly
 35 in place. By merely lifting the sleeve, therefore, the post can be moved on its pivot and the record removed. While I have described my invention as embodied in concrete form and as operating in a specific
 40 manner in accordance with the provisions of the patent statutes, it should be understood that I do not limit my invention thereto, since various modifications thereof will suggest themselves to those skilled in the art
 45 without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—
 50 1. In a sound reproducing machine, the

combination with a reproducer and a support therefor, of an imperforate bell-shaped sound diffuser supported so as to be free to vibrate, a sound conveying tube extending from the reproducer into the diffuser, and a
 55 supporting member secured to the crown of said diffuser and said tube and pivoted to said support.

2. In a sound reproducing machine, the combination with a reproducer, of an im-
 60 perforate bell shaped diffuser supported only at its crown, and a sound conveying tube extending from the reproducer into the diffuser to a point adjacent the support.

3. In a sound reproducing machine, the
 65 combination with a cylinder for receiving a record composed of two parts, a screw within said cylinder and extending longitudinally thereof, a threaded member cooperating with said screw and secured to the cylin-
 70 der, and means whereby the member is released from the screw by a rotary movement of said parts with reference to each other.

4. In a sound reproducing machine, the combination with a cylinder composed of
 75 two parts for receiving a record, a screw within said cylinder and extending longitudinally thereof, a two-part threaded member cooperating with said screw and secured to the cylinder, and means whereby the two
 80 parts of said member are separated to release the same from the screw by a rotary movement of the cylinder parts with reference to each other.

5. In a sound reproducing machine, the
 85 combination with a cylinder for receiving the record supported at one end and a support for the opposite end of the cylinder comprising a stationary element, and a post pivoted thereto having a bearing for the
 90 cylinder, said element and post being tapered adjacent the pivotal point and a correspondingly tapered sleeve engaging said tapered portions to rigidly lock the post.

In witness whereof, I have herewith set
 my hand this 2nd day of July, 1912.

LOUIS P. JACKSON.

Witnesses:

BENJAMIN B. HULL,
 FRANK J. SEABOLT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RECORD HOLDER,
#1,233,578-----F. Huizdil,
Patented-July 17th, 1917.
Filed-January 28th, 1916.

F. HUIZDIL.
RECORD HOLDER.

APPLICATION FILED JAN. 28, 1916.

1,233,578.

Patented July 17, 1917.

2 SHEETS—SHEET 1.

Fig. 1

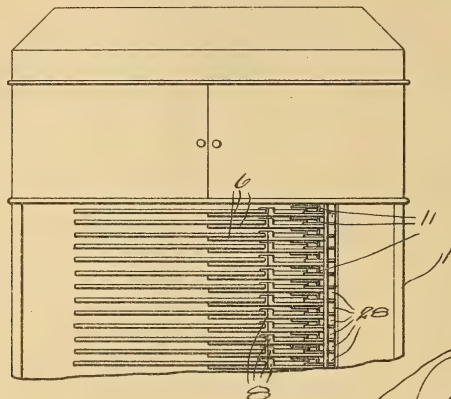
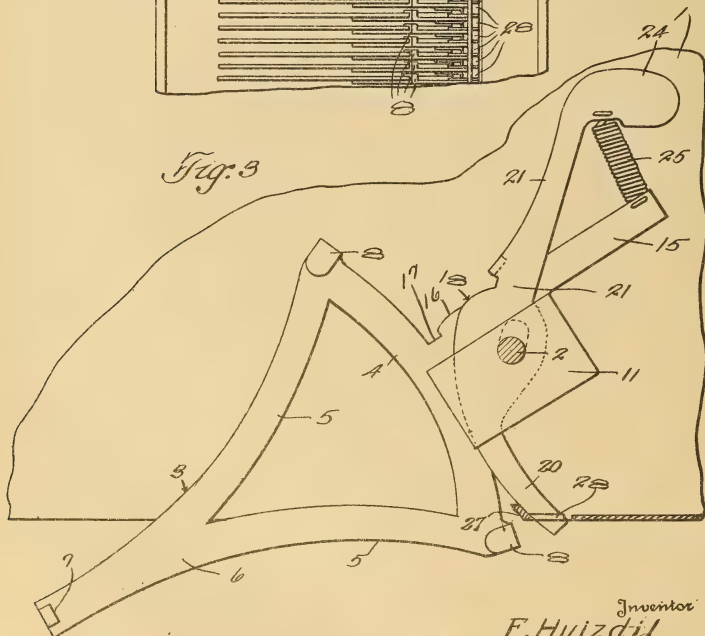


Fig. 3



Inventor
F. Huizdil

Witnesses

Charles H. T. T. T.
H. H. H. H.

By *A. H. H. H.*
Attorney

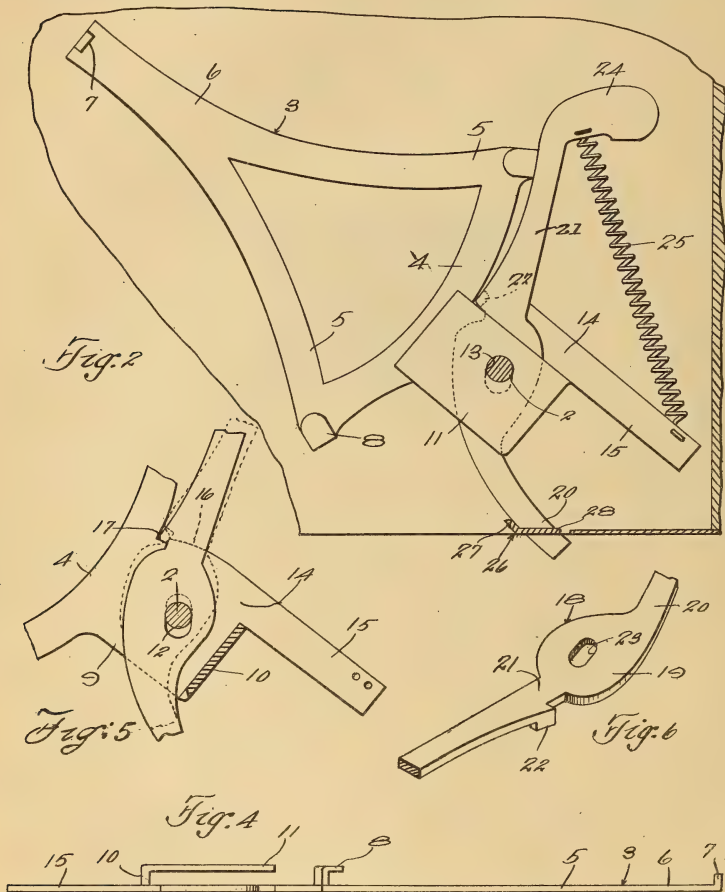
F. HUIZDIL.
RECORD HOLDER.

APPLICATION FILED JAN. 28, 1916.

1,233,578.

Patented July 17, 1917.

2 SHEETS—SHEET 2.



Witnesses

Chas. H. Smith
A. Hays Martin

Inventor
F. Huizdil

By *A. Hays Martin*
Attorney

UNITED STATES PATENT OFFICE.

FRANK HUIZDIL, OF DETROIT, MICHIGAN.

RECORD-HOLDER.

1,233,578.

Specification of Letters Patent.

Patented July 17, 1917.

Application filed January 28, 1916. Serial No. 74,915.

To all whom it may concern:

Be it known that I, FRANK HUIZDIL, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Record-Holders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in record holders and is particularly adapted for use in connection with talking machine cabinets for holding the records used thereon.

Another object of the invention is to provide a device which is arranged so that upon the pressing of a button, the desired record may be produced and may be readily removed from the holder and placed on the machine ready for playing.

A further object of the invention is to provide a device particularly adapted for use in connection with disk records which may be easily and cheaply constructed of sheet metal or any other desired material.

A further object of the invention is to provide a device which is spring actuated so that upon pressure on a button the desired record will be automatically moved out of the cabinet.

With these and other objects in view, the invention consists in the novel combination and arrangement of parts which will be fully set forth in the following specification and accompanying drawings, in which:—

Figure 1 is a view showing this improved device applied to the ordinary type of cabinet.

Fig. 2 is a fragmentary horizontal sectional view on an enlarged scale through Fig. 1 illustrating the device moved inwardly and ready for operation.

Fig. 3 is a view similar to Fig. 2, showing the device after it has been operated and in record delivering position.

Fig. 4 is an edge view of the record delivering frame.

Fig. 5 is an enlarged fragmentary detail sectional view illustrating in detail the latch means and the delivering arm, and

Fig. 6 is a fragmentary detail perspective view of the trip arm.

Referring to the drawings the numeral 1 designates the cabinet of an ordinary talking machine and mounted vertically within the cabinet near one side is the shaft 2 on which the record supporting mechanisms are mounted. It is to be understood that any number of record supporting mechanisms may be placed within the cabinet and each of said mechanisms comprises the various elements which will be more fully hereinafter described.

Taking up in detail the description of the record delivering mechanism, reference will be had particularly to Figs. 2 to 6 inclusive in which the numeral 3 designates generally the record delivering arm consisting of a curved base member or back 4 having formed at opposite ends the converging arms 5. The arms join and form the stem 6 provided at its outer end with an upstanding lug 7 for engagement in the apertures in the center of the usual record. Formed at opposite ends, of the base 4 are the hooks 8 which extend upwardly and inwardly and cooperate in supporting the record in place with the lug 7. Formed integrally with the base 4 intermediate its ends and on the edge opposite the edge on which the arms 5 are formed is a plate 9 provided at its extreme outer edge with an upstanding web 10. This web forms a support for the plate 11 which extends toward the base 4 in parallel relation to the plate 9 and cooperates with the plate 9 in forming a support for the record delivering arm which is journaled on the shaft 2 as will be more fully hereinafter described. Formed in the plate 9 at a point centrally thereof is an opening 12 which aligns with a similar opening 13 formed in the plate 11 and these openings are adapted to receive the shaft or axle 2 and to allow the arms to swing on said shaft.

Formed integrally with the plates 9 at the rear edge thereof and extending outwardly therefrom is a flange 14 provided with the extension 15 forming an arm to which the spring which will be more fully hereinafter described is connected. The edge of the flange 14 near the point where said flange joins the base 4 is curved as at

16 and provided at its extreme inner end with a notch 17 for a latch or lug 22, the use of which will appear as the description proceeds.

5 Coöperating with the delivering arm 3 is the latch arm designated generally by the numeral 18 comprising a central body 19 having formed integral therewith the releasing push arm 20. This push arm curves as shown away from the body 19 and extends through the wall of the cabinet 1 as clearly shown in Figs. 2 and 3. Formed at a point substantially diametrically opposite the arm 20 on the body 19 is a shank 21 which is formed on one edge near the point where it joins the body with an angularly extending lug 22. This lug is adapted for engagement in the notch 17 when the delivering arm is in its innermost position as illustrated in Figs. 2 and 5. A suitable elongated opening 23 is formed centrally of the body 19 and is arranged with its longitudinal axis extending in the direction of the arm 20. This elongated opening is adapted for the reception of the shaft 2 and is arranged so as to permit a slight movement of the trip arm with relation to the delivering arm and shaft so that when the device is set ready for operation and the lug 22 is in engagement with the walls of the notch 17 the delivering arm may be released by a slight pressure on the arm 20 thereby moving the lug out of engagement and permitting the delivering arm to swing. Formed at the outer end of the arm 21 is an angularly extending head 24 to which is connected the spring 25.

In order to cause the delivering arm to swing on its pivot a suitable retractile coil spring 25 is connected to swing the head 24 and the arm 15 and it will thus be seen that the delivering arm will tend to swing outwardly into delivering position.

The extreme outer ends of the arms 20 extend through transverse slots formed in the guide plates designated generally by the numeral 26 which comprise the back or body 27 having formed thereon at spaced intervals the extensions 28 which are spaced from each other a distance sufficient to accommodate the arms 20.

It will be apparent from the foregoing that in use when one of the records is desired a slight inward pressure is applied to the outwardly extending portion of the arm 20 and it will thus be seen that the arm will cause the body 19 to move inwardly so as to disengage the lug 22 from the notch 17 and this action will allow the spring 25 to swing the arm 15 toward the head 24 and thereby simultaneously swing the arm 3 outwardly into delivering position. Upon returning the record the same is placed on the arm 3 and moved inwardly and it will be

seen that the spring 25 will be tensioned and the said spring will also tend to move the lug 22 guided by the curved surface 16 into the notch 17 and thereby lock the record arm in its innermost position and hold the same until the extending portion of the arm 20 is moved inwardly, and the operation of the device repeated.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that such changes may be made in the combination and arrangement of parts as will fall within the spirit and scope of the appended claims.

What is claimed is:—

1. In a device of the class described, a record cabinet, a record carrier arm pivotally mounted within the cabinet, a spring normally urging said arm to swing outwardly, a latch for holding the arm in its innermost position, a push rod for releasing said latch and a head at the inner end of the latch connected to the spring so that when the spring is tensioned it will tend to move the latch into operative position with relation to the carrier arm.
2. In a device of the class described, a record cabinet, a carrier arm pivotally mounted within said cabinet, a latch slidably mounted on the pivot of the carrier arm, said latch being adapted to engage the arm to hold the same in its innermost position, a spring normally tending to swing the arm into its outermost position and a thumb piece on the latch projecting through the casing so that upon exerting pressure on the thumb piece the carrier arm will be swung outwardly.
3. In a record cabinet, a pivoted delivery arm, a releasing push arm slidably mounted with relation to the arm, a lug on the push arm to engage and hold the delivery arm in its innermost position, and a spring connected to the delivery arm and to said releasing push arm to urge the delivery arm into delivering position and also to hold the lug in engagement with the arm to hold said arm in closed position.
4. In a record cabinet, a vertical pivot, a delivery arm mounted on said pivot, a record support on said delivery arm, a finger extending from the delivery arm in a direction opposite from the record support, the delivery arm being provided with a notch at the point where the record support joins the same, a push arm slidably and pivotally mounted on the pivot of the delivery arm, a head at the inner end of the push arm, a stop lug on the push arm intermediate the head and its pivotal point, said stop being adapted to engage in the notch of the delivery arm to prevent the same from swinging outwardly until pressure is

5 applied to the push arm to move the lug out of the notch and a spring connected to the head and to the finger, said spring normally tending to move the delivery arm outwardly when the device is in closed position and also serving to hold the lug in the notch when the device is in its closed position.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK HUIZDIL.

Witnesses:

H. P. PAULGER,

I. M. GETCHELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

GRAPHOPHONE STOP,
#1,234,008-----C.S. Gerlach & C. F. Herman,
Patented-July 17th, 1917.
Filed-June 27th, 1916.

C. S. GERLACH & C. F. HERMAN.

GRAPHOPHONE STOP.

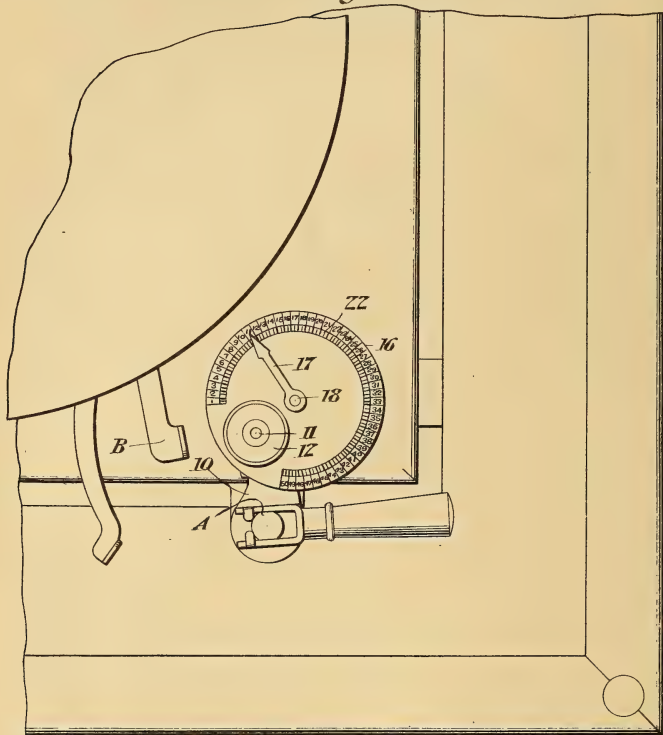
APPLICATION FILED JUNE 27, 1916.

1,234,008.

Patented July 17, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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C. S. GERLACH & C. F. HERMAN.
 GRAPHOPHONE STOP.
 APPLICATION FILED JUNE 27, 1916.

1,234,008.

Patented July 17, 1917.
 2 SHEETS—SHEET 2.

Fig. 2.

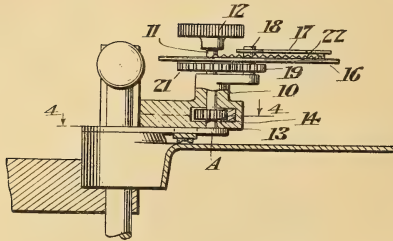


Fig. 3.

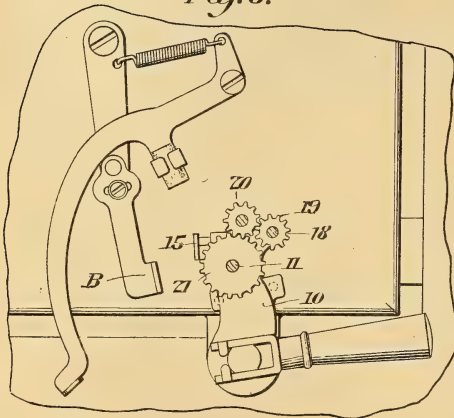
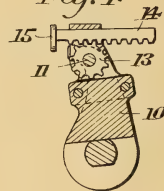


Fig. 4.



Witnesses

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Edward Jager

Inventors

*C. S. Gerlach &
 Charles F. Herman*

By *Victor J. Evans*

Attorney

UNITED STATES PATENT OFFICE.

CHRISTIAN S. GERLACH AND CHARLES F. HERMAN, OF BRANDON, WISCONSIN.

GRAPHOPHONE-STOP.

1,234,008.

Specification of Letters Patent.

Patented July 17, 1917.

Application filed June 27, 1916. Serial No. 106,237.

To all whom it may concern:

Be it known that we, CHRISTIAN S. GERLACH and CHARLES F. HERMAN, citizens of the United States, residing at Brandon, in the county of Fond du Lac and State of Wisconsin, have invented new and useful Improvements in Graphophone-Stops, of which the following is a specification.

This invention comprehends the provision of means for tripping the automatic stop mechanism of a talking machine immediately after the music ceases, irrespective of the dimensions of the record or length of the particular selection.

The nature and advantages of the invention will be better understood as the following description is read in connection with the accompanying drawings, the invention residing in the construction, combination and arrangement of parts as claimed.

In the drawings forming part of this specification like numerals of reference indicate similar parts in the several views and wherein:—

Figure 1 is a fragmentary top plan view of a talking machine showing our invention applied thereto.

Fig. 2 is an enlarged detail sectional view of the mechanism forming the subject matter of the invention.

Fig. 3 is a view showing the trip mechanism of the machine and the mechanism forming the subject matter of the invention partly in section.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2 looking in the direction of the arrow.

The mechanism forming the subject matter of our invention is primarily intended for use in connection with a machine of the character illustrated, although it is susceptible for use with other types of talking machines, and its general application is contemplated by the claim.

The mechanism preferably embodies a support 10 adapted to be secured upon the horn part A of the automatic stop mechanism of the machine in any suitable manner, the support 10 constituting a bearing for the shaft 11 which latter is mounted for rotation.

The upper extremity of the shaft 11 is provided with a knob 12 for rotating the shaft in either one or the other direction, while carried upon the opposite end of the shaft is a pinion 13 meshing with a rack bar 14 to manipulate the latter simultaneously

with the rotation of the shaft 11. The rack bar 14 is disposed at right angles to the shaft 11 and slides through an opening in the support 10. On one end of the rack bar 14 is an actuating member 15 the purpose of which will be hereinafter more fully described.

Mounted upon the support 10 is a dial 16 graduated along its outer edge and having suitable indicia, such as numbers with which the indicator hand 17 coöperates to determine the degree of adjustment essential for the different records or selections to be played. The indicator hand 17 is carried by a stub shaft 18 which is journaled upon the support 10, and provided with a gear wheel 19 which meshes with the gear 20, which latter in turn coöperates with the gear 21 on the shaft 11 to cause the indicator hand 17 to move in the same direction as the knob 12 when the latter is operated.

In practice, a record is placed upon the machine and the latter started, and at the end of the selection, or in other words when the music ceases, the knob 12 is rotated in the proper direction to move the rack bar 14 toward the trip B of the automatic stop mechanism of the machine. When the actuating member 15 of the rack bar engages the trip B, the automatic stop mechanism of the machine operates to throw the stop proper into operative position. When the trip B is actuated the operator ceases to rotate the shaft 11, and takes note of the particular number on the dial to which the indicator hand points. The record is then removed from the machine and marked with this number for future use. That is to say that when this particular selection is again used, it is only necessary prior to the starting of the machine to adjust the indicator finger 17 to the number in question, which moves the rack bar 15 to the proper position with respect to the trip B of the automatic stop mechanism, to stop the machine immediately at the finish of the selection. In order to determine the proper number of each record, the operator can if desired, move the needle to a point approximately one-fourth of an inch away from the center of the record, before starting the machine, and then rotate the shaft 11 to move the rack bar into engagement with the trip B. The needle can then be placed at the peripheral edge of the record and the machine started. When the record has been removed the same must be

marked with the number indicated on the dial by the hand 17, which will be the number of this record for future use.

5 The indicator hand 17 is preferably formed to engage notches 22 along the peripheral edge of the dial 16 so as to prevent slipping backward of the rack bar 15 when the latter is brought into engagement with the trip B of the automatic stop mechanism.

10 While we have shown and described what we consider the preferred embodiment of the invention, we desire to have it understood that we do not limit ourselves to this particular construction and arrangement of parts, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What is claimed is:

20 The combination with a trip element of an automatic stop mechanism for a talking

machine, of an actuating element therefor having a rack surface, a shaft mounted for rotation, a bearing for said shaft, a pinion carried by one end of the shaft and meshing with the rack surface of the actuating element to effect an adjustment of the latter with respect to the trip element, a dial provided with indicia, a plurality of stud shafts journaled in the bearing, a hand carried by one of said stud shafts and coöperating with indicia on the dial to indicate the adjusted position of the actuating element, and gearing carried by the respective shafts and meshing with each other to cause the hand to move in the same direction as the first mentioned shafts.

In testimony whereof we affix our signatures.

CHRISTIAN S. GERLACH.
CHARLES F. HERMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING-MACHINE,
#1,234,197-----Hubert A. Myers,
Patented-July 24th, 1917.
FILED--July 16th, 1915.

H. A. MYERS.
TALKING MACHINE.
APPLICATION FILED JULY 16, 1915.

1,234,197.

Patented July 24, 1917.

FIG. 1

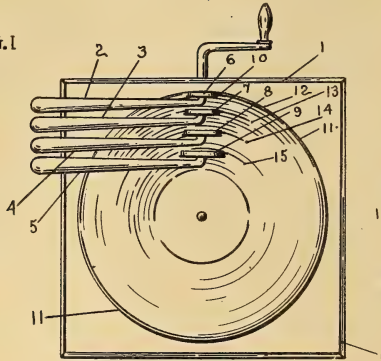


FIG. 2

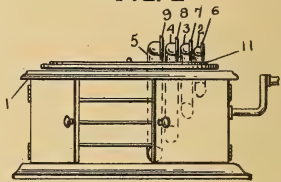


FIG. 3

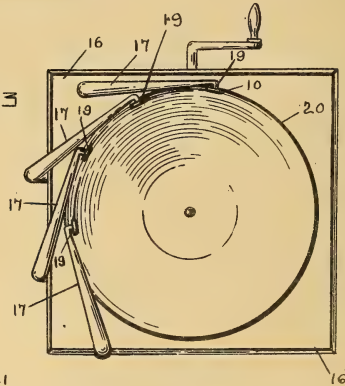


FIG. 4

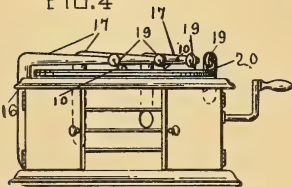
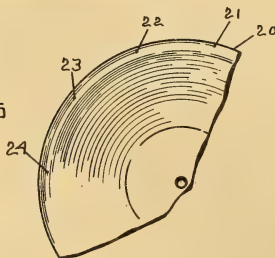


FIG. 5



Hubert A. Myers
INVENTOR

BY *[Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE.

HUBERT A. MYERS, OF TOLEDO, OHIO, ASSIGNOR TO HARVEY F. BANTA, OF GOSHEN, INDIANA.

TALKING-MACHINE.

1,234,197.

Specification of Letters Patent.

Patented July 24, 1917.

Application filed July 16, 1915. Serial No. 40,195.

To all whom it may concern:

Be it known that I, HUBERT A. MYERS, a citizen of the United States of America, residing at Toledo, Lucas county, Ohio, have invented new and useful Talking-Machines, of which the following is a specification.

This invention relates to recording and reproducing mechanisms.

This invention has utility in connection with sound mechanisms for simultaneously recording or reproducing tones or notes from different musical instruments or different voices.

Referring to the drawings:

Figure 1 is a plan view of an embodiment of the invention in a disk machine;

Fig. 2 is a side elevation of the device of Fig. 1;

Fig. 3 is a plan view of an embodiment of the invention in a disk machine wherein the needles are disposed in a successive or approximately tandem relation instead of a parallel relation, as in Fig. 1;

Fig. 4 is a side elevation of the device of Fig. 3; and

Fig. 5 is a fragmentary detail of a record.

Mounted on the amplifier containing box 1 are the arms 2, 3, 4, 5, extending to the amplifier, each arm carrying a diaphragm box 6, 7, 8, 9, and having extending therefrom a needle 10 to coact with the disk record 11. The linearly longer record adjacent the smaller diaphragm or sound box 6 may be used for the higher tones, say soprano, and the larger diaphragm box 9 on the linearly shorter distance of the record 11 for the lower or heavier tones, say as bass.

With the arms disposed in substantially parallel relation, the different records on the disk have simultaneous production or reproduction and the spiral groove for the needle of one arm is entirely independent of the spiral grooves for each of the other arms. To assist in placing needles for starting the needles in proper synchronism, seats 12, 13, 14, 15, are provided. With the needles properly positioned in these seats a starting of the record will insure the recording or the reproduction of the sounds in a definite relation to each other. The arms are shown

connected up for reproduction through the box 1, while for production the conducting ways may extend to different individuals as in the instance of a quartet, or to different musical instruments, as in the instance of orchestra records. There is possible considerable refinement in the handling of tones by the separate diaphragms, and the simultaneous operation of the diaphragms for reproduction eliminates machine combining of the tones and enables the hearer to have the separate sound origins brought to him for combining in his presence and hearing with improved detail most closely approaching the originals.

Instead of considerable variation in length of the separate records the records may be of approximately the same length with similar lineal travel rate for the needles by providing a box 16 with arms 17 having diaphragm or sound boxes 19 carrying needles 10 in adjacent spiral intergrouped grooves in this multiple spiral groove record 20. Here, as in the record 11, are provided seats 21, 22, 23, 24, to assist in accurately placing the needles for starting in simultaneous operation of reproduction or production.

What is claimed and it is desired to secure by Letters Patent is:

A sound handling mechanism comprising a rotatable disk record carrier platform for a single disk record embodying independent spiral paths on a single side thereof, a support for the platform, an amplifier, a plurality of independently swingable arms providing therein sound ducts, said arms symmetrically spaced from each other in the same general radial direction in their mounting on the support for clearance in their relatively independent travels radially of the platform, each duct being connected to the amplifier, a diaphragm box mounted on each duct, and a record coating needle for each duct disposed to travel in independent paths on the same side of a single record.

In witness whereof I affix my signature.

HUBERT A. MYERS.

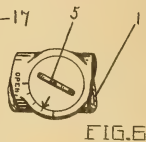
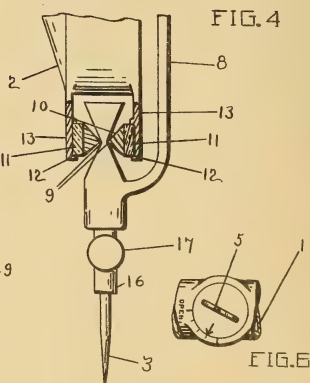
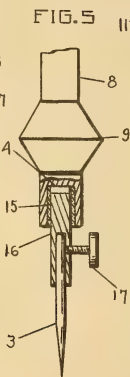
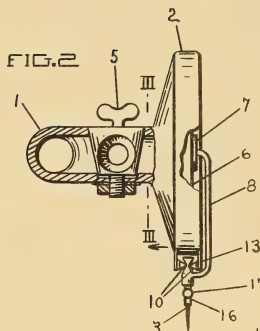
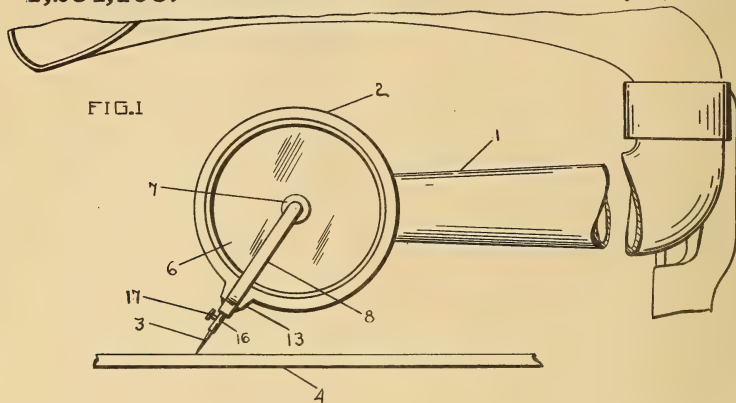
SOUND-BOX,

#1,234,198-----Hubert A. Myers,
Patented-July 24th, 1917.
Filed-July 22rd, 1915

H. A. MYERS.
SOUND BOX.
APPLICATION FILED JULY 22, 1915.

1,234,198.

Patented July-24, 1917.



Hubert A. Myers
INVENTOR

BY *[Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE.

HUBERT A. MYERS, OF TOLEDO, OHIO, ASSIGNOR TO HARVEY F. BANTA, OF GOSHEN, INDIANA.

SOUND-BOX.

1,234,198.

Specification of Letters Patent.

Patented July 24, 1917.

Application filed July 22, 1915. Serial No. 41,241.

To all whom it may concern:

Be it known that I, HUBERT A. MYERS, a citizen of the United States of America, residing at Toledo, Lucas county, Ohio, have invented new and useful Sound-Boxes, of which the following is a specification.

This invention relates to vibration transmitting needles and the connections therefrom.

10 This invention has utility when incorporated in tone producing and reproducing devices, as talking machines.

Referring to the drawings:

15 Figure 1 is a fragmentary side elevation of a talking machine embodying the invention;

Fig. 2 is a view from the left of Fig. 1, with parts broken away;

20 Fig. 3 is a section on the line III—III, Fig. 2, looking in the direction of the arrow, with the valve adjusted to open partially the duct;

Fig. 4 is an enlarged fragmentary detail of a needle lever fulcrum or mounting as to 25 the sound box;

30 Fig. 5 is a fragmentary view of the lever from the left of Fig. 4, with parts broken away to show the needle mounting in the lever; and Fig. 6 is a plan view of the valve indicator.

The hollow talking machine arm or duct 1 extends to the sound box casing or housing 2 which carries the needle or stylus 3 in position as to the record 4.

35 In the duct 1 adjacent the housing 2 is the valve 5 readily adjustable by rotation to restrict the cross-section or effective area of the duct 1 at a point adjacent the diaphragm 6 in the sound box or housing 2. By providing this adjustment, the volume or carrying range of the machine in reproducing may be reduced, but the tones preserved as to delicacy of timber and pitch without introducing any hollow or muffling sounds.

45 Adherent to the diaphragm 6 by a cemented rubber or sound deadening pad 7 is the lever 8. This connection of the lever 8 to the diaphragm is central as to the diaphragm.

The lever 8 has at its fulcrum the opposing notches 9 (shown in end view Fig. 4 and side view Fig. 5) engaged by the knife edge bearings 10, each cemented to a rubber or sound deadening pad 11, pressed into the opposing seats 12 of the arms 13 extending 55 from the housing or sound box 2.

Centrally disposed as to the fulcrum bearing 10, 10, the lever 8 has recess 14 in which may be a short section of rubber tube or sound deadening pad 15. Forced into this 60 recess 14 and held locked therein by this rubber 15 is the holder or quill 16 for the needle 3, which may be adjustably mounted and held in position by the set screw 17.

The mechanical sounds of the moving 65 parts of the device are effectively checked from transmission to the mechanism herein. The knife-edge bearing introduces a minimum of resistance and leaves the needle most sensitive for vibration. The action of the 70 rubber or resilient non-resonant means 11 is three-fold: (1) in mounting the knife edges, (2) in taking up lost motion, and (3) in deadening transmission of mechanical noises of the apparatus. The sound deadener 15 75 eliminates machine noises from mingling with the reproduction tones. The pads 11 tend to prevent any noises from the quick action of the lever 8 getting to the sound box from this source, while the pad 7 similarly acts between the lever 8 and the diaphragm 6.

The valved duct 1 permits easy control of tone volume.

What is claimed and it is desired to secure 85 by Letters Patent is:

1. A sound reproducer having a casing providing a pair of lugs, a diaphragm for the casing, and a stylus lever having a mounting on said casing and connected to 90 the diaphragm, said mounting comprising opposing knife edges, said knife edges being mounted between said lugs, and a resilient non-resonant means between the knife edges and the lugs for resiliently holding 95 the lever in position and insulating it from the casing.

2. A sound reproducer having a casing

provided on one side thereof with a pair of lugs, a diaphragm for the casing, and a stylus lever having a mounting on said casing and connected with the diaphragm, said 5 mounting comprising a pair of opposing knife edges, said pair of opposing knife edges being mounted upon said lugs, and rubber means between the knife edges and the lugs compressible therein as a resilient non-resonant mounting for resiliently holding the lever in position and insulating it 10 from the casing.

In witness whereof I affix my signature.

HUBERT A. MYERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE STYLUS,
#1,234,375-----W.T.Moore,
Patented-July 24th, 1917.
Filed---April 16th, 1917.

W. T. MOORE.
TALKING MACHINE STYLUS HOLDER.
APPLICATION FILED APR. 16, 1917.

1,234,375.

Patented July 24, 1917.

Fig. 1.

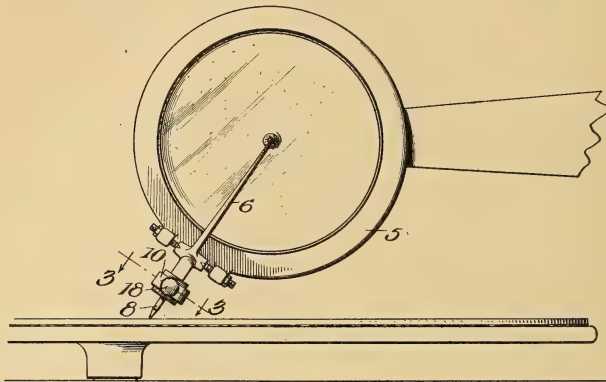


Fig. 2.

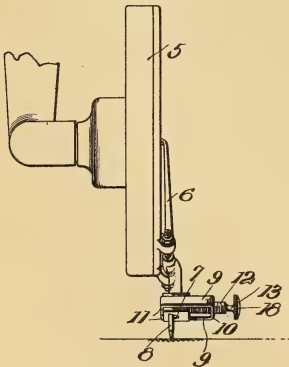
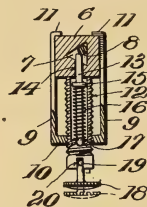


Fig. 3.



Inventor

Wm. T. Moore

By Max A. Schmidt

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM T. MOORE, OF LOUISVILLE, KENTUCKY.

TALKING-MACHINE-STYLUS HOLDER.

1,234,375.

Specification of Letters Patent.

Patented July 24, 1917.

Application filed April 16, 1917. Serial No. 162,287.

To all whom it may concern:

Be it known that I, WILLIAM T. MOORE, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Talking-Machine-Stylus Holders, of which the following is a specification.

This invention relates to devices for holding the stylus or needle of talking machines, and its object is to provide a holding means which enables the needle to be easily and quickly applied and removed.

The object stated is attained by means of a novel combination and arrangement of parts to be hereinafter described and claimed, and in order that the same may be better understood, reference is had to the accompanying drawing forming a part of this specification.

In the drawing—

Figure 1 is a side elevation, and Fig. 2 is a front elevation showing the application of the device, and

Fig. 3 is an enlarged section on the line 3—3 of Fig. 1.

Referring specifically to the drawing, 5 denotes the sound box of a talking machine, and 6 the stylus lever associated therewith. This lever has at its outer end a socket 7 in which seats and is held the needle or stylus 8, the device for holding the latter comprising the following parts:

To the socketed end of the lever 6 is applied a support comprising a yoke consisting of two branches 9 connected at one end by a cross-bar 10, and having at their opposite ends inturned terminals 11. The lever 6 seats between the yoke branches, with the terminals 11 engaging one side thereof and the cross-bar 10 spaced from the opposite side, as shown in Fig. 3.

The cross-bar 10 carries a sleeve 12 which is externally threaded to screw thereinto, and the inner end of the screw bears against the lever 6. Thus, it will be seen that when the screw is tightened up, the yoke is securely clamped on the lever.

In the sleeve 12 is slidably mounted a plunger 13 extending at one end from the inner end of the sleeve and passing into a transverse aperture 14 in the lever 8, said aperture extending to the socket 7 so that this end of the plunger may engage that portion of the needle 8 which seats in the socket. Inside the sleeve, the plunger has

an abutment 15, and a spring 16 is coiled around the plunger between this abutment and a shoulder 17 in the sleeve. The spring tends to advance the plunger against the needle, whereby the latter is securely held in the socket. The outer end of the plunger projects from the corresponding end of the sleeve and has a finger piece 18 to facilitate its manipulation. This end of the plunger also has a side pin 19 seating in a slot 20 in the sleeve when the plunger is advanced. Upon retracting the plunger to disengage the needle and giving the plunger a slight turn to place the side pin across the outer end of the sleeve, the plunger is held retracted, and upon giving the plunger another turn to bring the side pin in line with the slot, the plunger is released and advanced by the spring to engage and hold the needle. The needle can therefore be easily and quickly applied, and removed, and the device can also be readily applied to existing machines, it being necessary only to drill the aperture 14 in the lever 6.

While the preferred embodiment of the invention has been illustrated, it will be understood that various changes and modifications may be made without departure from the spirit and scope thereof as claimed hereinafter.

I claim:

1. The combination with a talking machine stylus lever having a stylus socket and a transverse aperture leading to the socket; of a supporting member having branches between which the lever is positioned and a cross-bar, the branches having inturned terminals engaging the lever, an externally threaded sleeve passing through the cross-bar and engaging the lever, and a spring-actuated plunger mounted in the sleeve and extending through the aforesaid aperture into the socket.

2. The combination with a talking machine stylus lever having a stylus socket and a transverse aperture leading to the socket; of a supporting member on the lever, an externally threaded sleeve carried by the member and engaging the lever to secure member to the lever, and a spring-actuated plunger mounted in the sleeve and extending through the aforesaid aperture into the socket.

3. The combination with a talking machine stylus lever having a stylus socket and a transverse aperture leading to the socket;

of a supporting member on the lever, an
externally threaded sleeve carried by the
member and engaging the lever to secure
said member to the lever, and a spring-
5 actuated plunger mounted in the sleeve and
extending through the aforesaid aperture
into the socket, the outer end of the sleeve
having a side notch and the plunger having
a side pin adapted to seat in said notch when

the plunger is advanced, and to seat across 10
the outer end of the sleeve when the plunger
is retracted.

In testimony whereof I affix my signature.

WILLIAM T. MOORE.

Witnesses:

ALEXANDER C. SCHUMAN,
SUSAN SCHUMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

UNITED STATES PATENT OFFICE

THOMAS A. EDISON, OF LLEWELLYN PARK, WEST ORANGE, NEW JERSEY, ASSIGNOR TO
NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION
OF NEW JERSEY.

CELLULOID RECORD-BLANK.

1,234,450.

Specification of Letters Patent.

Patented July 24, 1917.

No Drawing.

Application filed September 16, 1912. Serial No. 720,472.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Celluloid Record-Blanks, of which the following is a description.

My invention relates to celluloid articles such as record blanks, and more particularly, but not exclusively, to those of cylindrical form. The object of my invention is to provide an improved record blank of the above type which is provided with a true and suitably colored surface capable of receiving an accurate impression from a sound record mold.

Celluloid may be obtained in the market in desired form and of desired thickness for the manufacture of sound records and blanks, the commercial celluloid for cylindrical record blanks being in the form of long tubes which may be readily cut into sections of desired length. Records as heretofore molded from these tubes are defective in that upon reproduction they emit surface noises foreign to the selections recorded. I have discovered that this defect is due to the fact that the surface of the commercial celluloid is filled with small pits and other defects which are not effaced and thereby prevent the accurate molding of the celluloid when, as has heretofore been done, the surface of the celluloid in its commercial condition is pressed against the record surface of the mold. In order to obviate this objection, I remove the defective outer portion of the commercial celluloid, as by abrasion or turning. In practice, I find that the removal of an outer portion to a depth of .001 of an inch is sufficient to produce a true surface which is capable of receiving a true impression of the record undulations without the defects producing the surface noises hereinbefore referred to.

The next step in the formation of my improved record blank consists in dyeing the outer surface of the celluloid cylinder or other blank in such a manner as not to injure the elasticity, molding qualities, and other desired properties of the celluloid. The dyes I prefer to use, that is, anilin dyes, are soluble in alcohol and acetone; but as camphor, which is one of the ingredients of celluloid, is soluble in alcohol and acetone, a

solution of these dyes in either of the above solvents would, if applied to the surface of the celluloid blank, partly dissolve the camphor from the celluloid and injure the elasticity of the blank and the capability of the latter to be accurately molded. I obviate this objection by adding to a solution of the dye in alcohol or acetone sufficient water to prevent the camphor in the celluloid from going into solution when the dye is applied to the surface of the celluloid. I have obtained good results with a solution containing about two parts by weight of water to one part by weight of alcohol solvent and three parts by weight of water to one part by weight of acetone solvent. Such solutions as those specified above, soften the celluloid sufficiently to permit proper absorption of the dye and at the same time prevent an injurious dissolution of the camphor.

In dyeing a record cylinder, I take a blank, the outer surface of which has preferably been prepared as described above and dip the same into the water containing solution described above for a suitable length of time, the depth of the color of the cylinder depending upon the strength of the solution and the time the cylinder remains in the same. I have obtained good results by leaving a record in a solution such as those specified above for about three minutes. I next remove the cylinder from the solution and wash the same with water until all of the surplus solution on the cylinder is removed. This washing insures the uniform dyeing of the cylinder. Finally, I dry the cylinder in the atmosphere or in any other suitable way.

The improved record blank obtained as described above has a true outer surface capable of receiving an accurate record impression. It has its outer surface suitably colored; and its elasticity and molding qualities are unimpaired. Accordingly, when the record undulations are impressed therein it produces a sound record of greatly improved acoustic properties.

Having now described my invention, what I claim as new and desire to protect by Letters Patent is as follows:

1. The process of making record blanks or the like which comprises applying to the surface of a celluloid blank an acetone solution of dye which will not dissolve the cam-

phor in the celluloid, then washing the blank, and finally drying the same, substantially as set forth.

2. The process of making record blanks or the like which comprises applying to the surface of a celluloid blank a solution of dye containing acetone as a solvent for the dye and sufficient water to prevent the acetone from dissolving the camphor in the celluloid during the dyeing operation, then washing the blank, and finally drying the same, substantially as set forth.

3. The process of making record blanks or the like which comprises applying to the surface of a celluloid blank or the like a solution of anilin dye containing one part by weight of acetone solvent and three parts by weight of water, then washing the blank or the like and finally drying the same, substantially as set forth.

4. The process of making celluloid sound record blanks or the like which comprises

removing a thin surface portion of the celluloid and then dyeing the surface of the celluloid with a solution of dye which will not dissolve the camphor in the celluloid, the said solution comprising an anilin dye, a solvent therefor other than water, and a quantity of water in excess of the solvent, substantially as described.

5. The process of making celluloid record blanks or the like, which comprises removing the surface portion of the celluloid, and then dyeing the surface of the celluloid with a solution which will not dissolve the camphor in the celluloid, substantially as set forth.

This specification signed and witnessed this 12th day of September, 1912.

THOS. A. EDISON.

Witnesses:

FREDERICK BACHMANN,
MARY J. LAIDLAW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MOLD OR TRANSFER PLATE,
#1,234,451-----T. A. Edison,
Patented-July 24th, 1917.
Filed-Oct. 26th, 1912.

T. A. EDISON.
MOLD OR TRANSFER PLATE.
APPLICATION FILED OCT. 26, 1912.

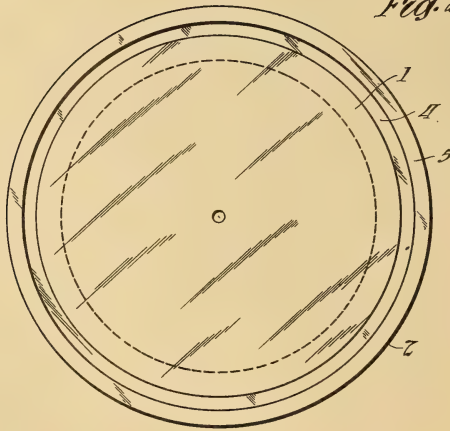
1,234,451.

Patented July 24, 1917.

Fig. 1



Fig. 2



Witnesses
C. E. Brown.
Frederick Bachmann.

Inventor:
Thomas A. Edison
by Frank L. Rogers
His Atty.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, WEST ORANGE, NEW JERSEY, ASSIGNOR TO
NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION
OF NEW JERSEY.

MOLD OR TRANSFER PLATE.

1,234,451.

Specification of Letters Patent.

Patented July 24, 1917.

Application filed October 26, 1912. Serial No. 727,830.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Mold or Transfer Plates, of which the following is a description.

My invention relates to apparatus for molding sound records, the apparatus of the present invention being an improvement on that disclosed in my copending application, Serial No. 694,658, filed May 2, 1912. More particularly, my invention is designed for use in connection with the molding process set forth and claimed in an application of Jonas W. Aylsworth, Serial No. 674,289, filed January 30, 1912. According to this process, a base or backing is provided with a surface veneer or covering of suitable material, the process involving the formation of a surface veneer upon the smooth polished surface of a metallic transfer plate or other blank mold and the transfer of the same to the surface of the object to be coated under heat and pressure with the firm adhesion or welding of the surface veneer to the object. The invention herein claimed relates more particularly to improvements in the construction of the mold or transfer plate above referred to.

In the formation of the surface veneer on the transfer plate or blank mold in carrying on the above named process of Aylsworth, the surfacing material, such as the varnish referred to in the said application of Aylsworth, in a thickly fluid form is coated on the transfer plate or mold preferably by flowing the same over said plate or mold during the rotation of the latter, as disclosed, for example, in my applications, Serial Nos. 727,828 and 727,829 filed on even date herewith. By reason of the rotation of the transfer plate or mold, bubbles and particles of dirt and other foreign matter which are commonly found in the surfacing material are thrown to the periphery of the said plate or mold, the central portion of the coating being homogeneous and substantially free from imperfections. The principal object of the invention herein claimed is to provide a mold or transfer plate whereby the peripheral portion of the coating may be readily removed from the central por-

tion so that a homogeneous veneer free from imperfections may be obtained.

In order that my invention may be more clearly understood, attention is hereby directed to the accompanying drawing forming a part of this specification and in which—

Figure 1 illustrates a central vertical sectional view of a mold or transfer plate embodying my invention and containing a coating or a veneer of surfacing material; and

Fig. 2 illustrates a top plan view of the said mold or transfer plate without the veneer or surfacing material. In both the views like parts are designated by the same reference characters.

Referring to the drawing, the numeral 1 designates a circular mold plate having a plane mold surface. The plate 1 is surrounded and detachably supported by a ring 2, the inner diameter of which is smaller than the diameter of the plate 1, the ring 2 being provided with a recess 3 in which the plate 1 is seated and fits closely. A surface 4 is formed on the ring 2 around the recess 3, this surface being flush with the mold surface of the plate 1 when the latter is supported within the said ring. A flange 5 is formed around the surface 4 to prevent the surfacing material, which is shown at 6 in Fig. 1, from flowing over the outer edge of the ring. The plate 1 is preferably formed of German silver and has a polished mold surface, as disclosed in my application, Serial No. 694,658, above referred to, the ring 2 being preferably formed of bronze.

In using the mold or transfer plate described above, the surface material in a viscous thickly fluid form is flowed over the plate 1 and beyond the same over the surface 4, the mold or transfer plate being rotated as disclosed in my before mentioned applications, Serial Nos. 727,828 and 727,829 the surfacing material adhering by reason of its consistency to both the plate 1 and the surface 4 of the ring 2. When the plate 1 is lifted from the ring 2, the portion of the surfacing material over the surface 4 is readily detached from the material on the plate 1. By making the plate 1 of proper diameter and the surface 4 of proper width, the peripheral portion of the veneer containing the bubbles, dirt and other imperfections is completely removed and a homogeneous

coating or veneer formed on the plate 1. If the plate 1 has a diameter of about $10\frac{1}{4}$ inches, the surface 4 may be about $\frac{1}{2}$ of an inch in width. It should be noted that the thickened peripheral portion of the coating 6 resulting from the flow of the surface material upward on the inner surface of the flange 5, as shown, is also removed when the plate 1 is lifted from the ring 2; and unevenness in the thickness of the coating or veneer due to this cause is thereby eliminated. The coating or veneer having been applied to the plate 1 as described above, it may now be dried, hardened and applied to the object to be coated in the manner described in the above mentioned application of Aylsworth.

My invention is shown herein in connection with the formation of a veneer for a disk-shaped sound record tablet; but it is not limited to this application, as various changes may be made in the specific construction disclosed without departing from the spirit of the invention.

What I claim as new and desire to protect by Letters Patent of the United States is as follows:

1. As a new article of manufacture, a mold or transfer plate comprising a flat central plate having a smooth mold surface and a ring detachably supporting said plate, said ring fitting closely around said plate and being provided with a surface arranged around and flush with the mold surface of said plate, substantially as described.

2. As a new article of manufacture, a mold or transfer plate comprising a flat central plate having a polished mold surface and a ring provided with a surface arranged closely around and flush with the mold surface of said plate, substantially as described.

This specification signed and witnessed this 25th day of October 1912.

THOS. A. EDISON.

Witnesses:

FREDERICK BACHMANN,
MARY J. LAIDLAW.

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CABINET TALKING-MACHINE,
#1,234,555-----Henry C. Miller,
Patented--July 24th, 1917.
Filed---Oct. 29th, 1908.

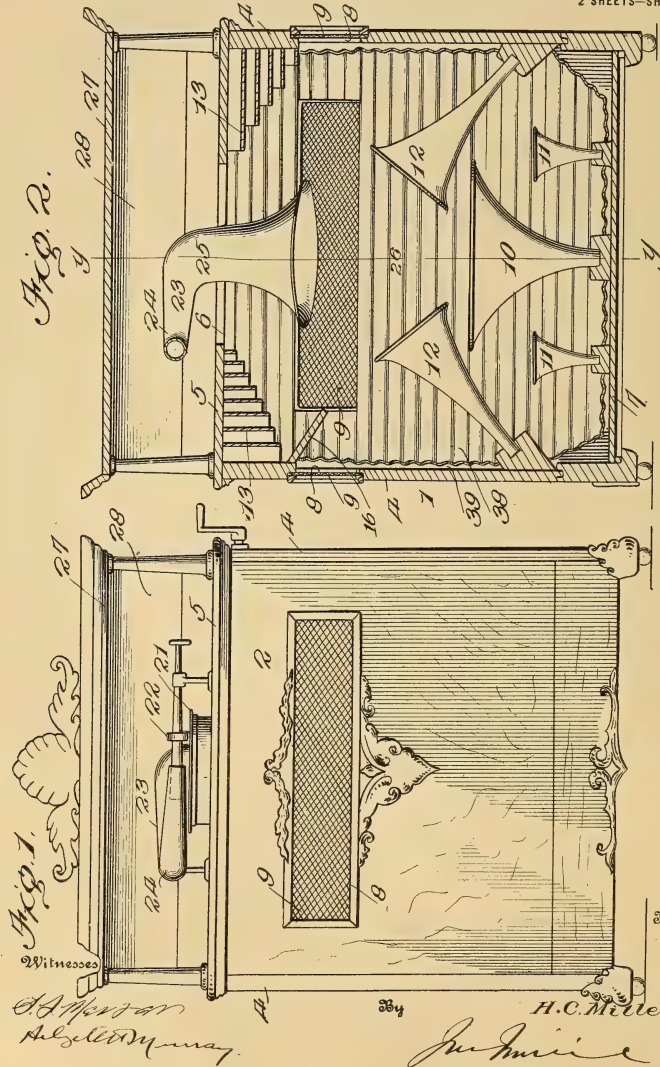
H. C. MILLER.
CABINET TALKING MACHINE.

APPLICATION FILED OCT. 29, 1908. RENEWED DEC. 21, 1916.

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2 SHEETS—SHEET 1.



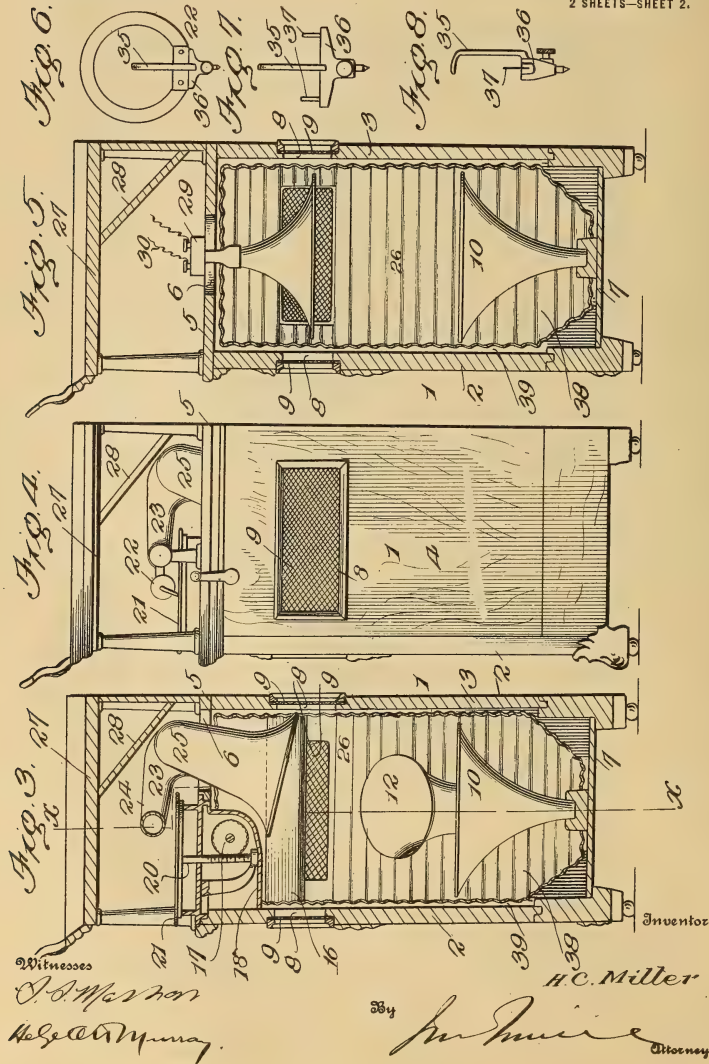
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

HENRY C. MILLER, OF WATERFORD, NEW YORK, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

CABINET TALKING-MACHINE.

1,234,555.

Specification of Letters Patent.

Patented July 24, 1917.

Application filed October 29, 1908. Serial No. 460,066. Renewed December 21, 1916. Serial No. 138,285.

To all whom it may concern:

Be it known that HENRY C. MILLER, a citizen of the United States, residing at Waterford, in the county of Saratoga and State of New York, has invented certain new and useful Improvements in Cabinet Talking-Machines, of which the following is a specification.

This invention relates to improvements in cabinet talking machines of the type in which the amplifying horn is inclosed within the cabinet.

According to my present invention I provide a downwardly extending sound amplifier, and cooperating therewith, a series of tone sympathizers or resonators, some of which are located in the cabinet below the plane of the end of the amplifier and others of which are located above said plane.

In some of the sound reproducing machines as at present constructed, it sometimes occurs that the amplifier or horn, in addition to magnifying and amplifying all the sounds and tones passing therethrough, also acts as a resonator for some one or more of the tones amplified by it, to the exclusion of other tones or overtones of the scale. The result of this is that when during the reproduction of a selection, certain tones occur, those tones are given an undue amplification over that given to the other tones of the selection. This result is objectionable because in reproducing a given selection, a relatively unimportant tone of the selection is liable to be given undue prominence, volume, emphasis, or amplification, whenever that note or tone occurs, thereby making the reproduction different in character from the rendition of the original selection from which the record is made.

One object of my invention is to provide a series of tone sympathizers or resonators which, cooperating with the amplifier or horn, will respectively vibrate in sympathy with or respond to substantially every tone and overtone in the musical scale, thereby giving to each note or tone of a selection which is being reproduced, the proper amount of amplification and thereby rendering the reproduction or reproduced sound more nearly balanced and more nearly like the original rendition of the recorded selection.

Another of the objects of my invention is to provide means for diffusing the sound in

all directions and with all the overtones properly magnified, augmented or amplified in order to produce a more perfect reproduction of the recorded selection.

In carrying out my invention substantial results are obtained along the lines above indicated, by arranging or providing a sound chamber or sound passage with a series of hollow tubular sound sympathetic or resonating devices into which the sound enters as it comes from the amplifier and from which it is given back or returned properly augmented, into the sound chamber or sound passage. The various sounds, tones and overtones of a given selection being reproduced, are substantially picked up by those pockets, tubes, or resonators which vibrate respectively in sympathy with said sounds and enrich the character of the reproduction, such enriched sounds passing from the chamber or passage to the atmosphere through appropriate openings in said chamber or passage.

Other and further objects and purposes of my invention will appear in the specification and claims below.

In the drawings, forming a part of this specification, and in which the same parts are designated by the same reference characters, throughout the various views, Figure 1 is a front elevational view of my invention, as applied particularly to a sound reproducing machine; Fig. 2 is a section taken on the line $x-x$ of Fig. 3; Fig. 3 is a vertical central section taken on the line $y-y$ of Fig. 2; Fig. 4 is a side elevational view of the same; Fig. 5 shows in a section similar to that of Fig. 2, a modified form of my invention; and Figs. 6, 7 and 8 illustrate details of construction.

In the construction illustrated in the drawings, a cabinet 1 comprising a front 2, a rear 3 and sides 4-4, is provided with a top 5, or partition formed with an opening 6. The bottom 7 is closed. The front 2, the rear 3, and the sides 4-4 are each provided respectively with an opening 8 for the exit of sound, and said openings may be provided with deflectors and may be covered by coarse mesh fabric or material 9. Supported on the bottom 7 and with its lower end closed, is a substantially conical tubular horn 10, preferably having flaring side walls, and adjacent thereto within the cabinet or chamber are similar smaller horns 11 also

having one end thereof stopped or closed. The horns or tubes 10 and 11 are preferably substantially vertically disposed with their flaring open ends extending substantially in the direction of the discharging end of the amplifier, as will hereinafter appear. Extending from the sides 4—4 are other horns 12—12 extending inwardly toward the discharging end of the amplifier or amplifying horn, said horns 12—12 being preferably provided with flaring side walls; having their enlarged open ends just above the mouth of the horn 10; and having their smaller ends suitably stopped or closed. I may employ other horns similar to those just above described to extend similarly inwardly from the front 2 and rear 3.

Just below the top or partition 5 and inside of the cabinet 1 are arranged a series of resonators comprising pockets or tubes closed at one end and opened at the other. One series or sets of resonators or pockets 13 may be horizontally or transversely disposed within the main casing or cabinet 1 and the other set or series 13' may be substantially vertically disposed. These pockets, tubes or resonators 13—13' are preferably of different lengths and of different capacities. There are provided a sufficient number of these resonators to strengthen by sympathetic vibration substantially all of the tones and overtones that come from the amplifying horn.

Adjacent the openings in the walls of the cabinet 1, there may be provided deflectors 16, for the purpose of deflecting the sound through the openings 8 to the room or outside atmosphere.

Mounted in the interior of the cabinet 1 is a motor 17 inclosed and cut off from the interior chamber or passage in the cabinet by a casing or partition 18. The shaft 20 of the motor extends upwardly through the top 5 of the cabinet or casing and supports at its upper end the usual turntable 21 for receiving a disk sound record. A sound conveyer 22' is slidably mounted on the top 5 and carries a sound box 22. The end of the sound conveyer 22' fits and slides in the end of a sound amplifier 23, which is curved horizontally at 24 and then substantially vertically at 25 and leads into the sound chamber or passage 26. The free end of the sound amplifier 23 is preferably flared or bell shaped and discharges and directs the sound issuing therefrom downwardly toward the flared opened ends of the tubes or horns 10, 11 and 12 below the same. The amplifying horn 23 passes through an opening 6 in the top 5, said opening being considerably larger than the diameter of the amplifier, where the same passes through it, and serving as an exit for sound from the chamber or passage 26. Above the top or partition 5 is a superstructure 27 designed

to add beauty to the cabinet and also serving as a sound deflector. A deflector 28 is arranged within the superstructure just above the opening 6 for the purpose of diffusing the sound discharged against it through said opening 6.

Instead of employing the usual sound box 22, I may use a receiver 29 electrically connected by wires 30 with a central station.

The sound chamber or passage 26 is preferably provided with a lining 39 of corrugated formation and spaced from the walls of the cabinet providing thereby a resonating chamber or space between said lining 39 and the walls of the cabinet.

In operation the sound from the reproducer is received by the amplifier and is amplified thereby. From the amplifier and by it the sound is directed downwardly into the sound chamber or passage 26. The sound thus delivered from the reproducer or sound box, through the entire passage comprising the amplifier and the chamber 26 and entering said chamber 26 and the resonators comprising horns, tubes and pockets, above described, sets into vibration one or more of the sound resonators or tone sympathizers in communication with the said passage. Certain tones delivered to the passage will cause a sympathetic vibration to be set up in a sympathizer of that particular size or capacity which corresponds thereto. Other tones will be received by other tubes or resonators or sympathizers corresponding to those other tones. The series of sympathizers within or in communication with the chamber 26 is preferably made large enough and sufficient in number to provide a resonator for all the tones and overtones of any selection that may be reproduced on the machine. There should be respectively a tone sympathizer or resonator for all the tones and overtones of the musical scale. In this manner the tones and overtones of a selection being reproduced may be all augmented or amplified and each tone and overtone will be given its proper amplification, and the resultant sound with the overtone properly brought out by the tone sympathizers may be discharged from the interior chamber or passage 26, through the openings 9 in the walls thereof, to the outside atmosphere. The reproduced sound also passes through the opening 6 in the top 5 and surrounding the downturned portion of the amplifier, and the sound thus issuing to the opening 6 may be deflected outwardly by the deflector 28. By employing the various sympathetic devices or resonators, the various tones will each find a corresponding sympathetic sound augmentor or amplifier, which serves to increase or magnify those sounds. These sound sympathetic devices comprising horns, pockets or tubes, all preferably closed

at one end, are preferably of various shapes or sizes, an essential feature of the invention being the making of these various tone sympathizers of different capacities.

In Figs. 6, 7, and 8, are shown a sound box and details of construction thereof, said sound box being well adapted for the sound reproducing machine, above described. The stylus lever 35 extends from the center of the diaphragm of the sound box to the cross bar 36 and the said bar 36 is secured to the sound box casing by spring fulcrum members 37.

While I have described my invention as applied to the balancing and enriching of the various tones and overtones which may be present in any selection which is to be reproduced from a talking machine record and have described the invention as embodied in a talking machine or sound reproducing machine, I do not wish to be construed as having limited my invention solely to the art of reproducing sound, as the invention is applicable to the art of sound recording. In applying the invention to a sound recorder the various sound sympathetic devices, horns, tubes, or resonators in the passage leading to the sound box vibrate in the same manner in sympathy respectively, with the various tones or overtones entering the sound chamber or passage and add their effect to the resultant tone or tones impressed upon the diaphragm.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States, is:—

1. In a machine for reproducing sound vibrations, the combination of a cabinet providing a substantially inclosed space having communication with the outside atmosphere through an opening in a wall thereof, an amplifying horn extending into said space, sound reproducing means exterior to said space and arranged for delivering sound waves into the small end of the amplifying horn, and a plurality of resonators of different capacities closed at one end and open at the other arranged within said space and proportioned so as to strengthen the harmonics or overtones of the respective primary tones produced by said reproducing means.

2. In a machine for reproducing sound, the combination of a cabinet providing a substantially inclosed space having communication with the outside atmosphere through an opening in a wall thereof, an amplifying horn extending into said space, sound reproducing means exterior to said space and arranged for delivering sound waves into the small end of the amplifying horn, and a plurality of resonators of different capacities closed at one end and open at the other arranged within said space, said resonators being in sufficient numbers, and

proportioned so as to strengthen the respective primary tones and also the harmonics or overtones of said respective primary tones produced by the reproducing means.

3. In a machine for reproducing sound, the combination of a cabinet providing a substantially inclosed space having communication with the outside atmosphere through an opening in a wall thereof, an amplifying horn extending into said space, sound reproducing means exterior to said space and arranged for delivering sound waves into the small end of the amplifying horn, and a plurality of resonators of different capacities closed at one end and open at the other arranged within said space, said resonators being of sufficient numbers and proportionate capacity to produce the harmonics or overtones of the respective primary tones produced by the reproducing means and also strengthen the overtones of the respective primary tones as reproduced by the reproducing means.

4. In a machine for reproducing sound vibrations, the combination of a cabinet providing a substantially inclosed space having communication with the outside atmosphere through an opening in a wall thereof, an amplifying horn extending into said space, sound reproducing means exterior to said space and arranged for delivering sound waves into the small end of the amplifying horn, and a plurality of resonators of different capacities closed at one end and open at the other arranged within said space, said resonators formed with flaring side walls to strengthen the respective amplified sounds produced by the reproducing means and the amplifying horn.

5. In a machine for reproducing sound vibrations, the combination of a cabinet providing a substantially inclosed space having communication with the outside atmosphere through an opening in a wall thereof, an amplifying horn extending into said space, sound reproducing means exterior to said space and arranged for delivering sound waves into the small end of the amplifying horn, and a plurality of resonators of different capacities closed at one end and open at the other arranged within said space, a portion of said resonators being formed with flaring side walls and other portions of said resonators being formed with substantial parallel side walls whereby all the reproduced primary and overtones produced by said reproducing means and amplifying horn are strengthened and magnified.

6. In a talking machine, the combination of a cabinet providing a substantially inclosed chamber having an opening through a wall thereof into the outside atmosphere, reproducing means outside of said chamber, a tubular passage leading from the repro-

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ducing means and opening into said chamber, and a plurality of resonators of different capacities to strengthen the primary tones and the harmonics or overtones reproduced by said reproducing means and delivered into said chamber, said resonators comprising separate chambers of different lengths and closed at one end, the length of said resonator chambers being proportioned to the requirements of the reproduced primary and harmonics or overtones of the musical scale.

7. In a machine for reproducing sound vibrations, the combination of a rotatable turntable, a sound box having a diaphragm and stylus attached thereto, a sound conveying passage open to the atmosphere at one end by a relatively large opening and leading to the sound box by a tapered passage portion having its small end closed by the diaphragm, and a plurality of resonator chambers of different depths and capacities, said resonators closed at one end and opening at the other into the sound conveying passage, the number and capacities of said resonator chambers being respectively proportioned to the requirements of the primary tones and also of the overtones of the musical scale, whereby said primary tones are strengthened while passing through the sound conveying passage.

8. In combination, a cabinet formed with an outlet, means for reproducing sound, a sound conveyer coöperating therewith and directing the sound into the cabinet, tone sympathizers within the cabinet for amplifying the sound, and a corrugated lining within and substantially conforming to the walls of the cabinet to provide a resonator.

9. In combination, a cabinet formed with an opening for the exit of sound, sound reproducing mechanism including a reproducer, the reproducer being on the outside of the cabinet, an amplifier communicating with the reproducer and extending through an opening in the cabinet, the open end of the amplifier being inclosed within the cabinet below the top thereof, means inclosed within the cabinet below the top and below the plane of the outlet opening and adjacent the open end of the amplifier for causing sympathetic sound, the said latter means being independent of and separated from said amplifier, and a resonator conforming substantially to the interior of the cabinet.

10. In combination, a cabinet formed with an inlet and an outlet opening, a corrugated resonator conforming substantially to the inner walls of the cabinet, reproducing means, a sound conveyer communicating with the reproducing means and extending through the inlet opening, the open end of the conveyer projecting within the corrugated resonator, and hollow tone sym-

thizers in the cabinet and spaced from the open end of the sound conveyer.

11. In combination, a cabinet formed with a sound exit opening, a reproducer, an amplifier communicating with the reproducer and leading to the inside of the cabinet, and a corrugated lining inside and spaced from the cabinet, said lining having an opening in line with the opening in the cabinet for the discharge of sound to the atmosphere.

12. In combination, a cabinet, formed with an opening for the exit of sound, a corrugated bottom end wall inside the cabinet, a reproducer, and an amplifier communicating with the reproducer and leading into the cabinet.

13. In combination, a cabinet having on its inside a corrugated lining spaced from the walls thereof, and formed with sound exit openings, a reproducer, an amplifier communicating with the reproducer and leading into the cabinet, and a resonator within the cabinet.

14. In combination, a cabinet formed with an opening and having corrugated inside surfaces, a reproducer and an amplifier leading into said cabinet, and tone sympathizers inside of said cabinet.

15. In combination, a cabinet formed with sound inlet and outlet openings and provided on the inside with a corrugated surface, a deflector in alinement with one of said openings, a sound reproducing machine including an amplifier and reproducer, the amplifier extending through one of the openings and into the cabinet, and tone sympathizers within the cabinet.

16. In combination, a cabinet formed with sound inlet and outlet openings, a corrugated surface inside the cabinet and parallel with the walls thereof, tone sympathizers located at different points in the cabinet, and a sound reproducing machine including a reproducer and amplifier, the amplifier extending within the cabinet.

17. In combination, a cabinet formed with sound inlet and outlet openings, a corrugated surface in the cabinet and spaced from the walls thereof, a plurality of tone sympathizers in the cabinet, a plurality of minor tubes of varying lengths arranged in the cabinet, and a reproducing machine including a reproducer and amplifier, the reproducer being outside the cabinet and the free end of the amplifier extending within the cabinet.

18. In combination, a cabinet formed with sound inlet and outlet openings, a corrugated portion inside the cabinet and spaced from the walls thereof, sound reproducing mechanism, and an amplifier connected to said sound reproducing mechanism and extending within the cabinet, the corrugated portion coöperating with the amplifier.

19. In combination, a cabinet formed with

sound inlet and outlet openings, sound reproducing mechanism including a reproducer, a sound conveyer connected to the sound reproducing mechanism and in communication with the sound inlet opening in the cabinet, and a lining conforming to the inside of the cabinet and spaced from the walls thereof to form a resonator.

20. In combination, a cabinet formed with sound inlet and outlet openings, sound reproducing mechanism including a reproducer, a sound conveyer connected to the sound reproducing mechanism and in communication with the sound inlet opening in the cabinet, and a lining conforming to the inside of the cabinet and spaced from the walls thereof to form a resonator, said lining having projecting portions.

21. In combination, a cabinet formed with sound inlet and outlet openings, sound reproducing mechanism including a reproducer, a sound conveyer connected to the sound reproducing mechanism and communicating with the sound inlet opening in the cabinet conforming to the inside and a corrugated resonator in the cabinet thereof.

22. In combination, a cabinet formed with inlet and outlet openings and provided on its inside with a corrugated resonator corre-

sponding to the walls of said cabinet, sound reproducing means, and an amplifier communicating with the sound reproducing means and projecting within the corrugated resonator.

23. In combination, a cabinet, a lining within and adjacent the walls of the cabinet, said lining constituting a hollow resonator, the cabinet and the lining having registering openings for the exit of sound, sound reproducing means, and an amplifier communicating with the sound reproducing means and projecting into the hollow resonator.

24. In combination, a cabinet, a corrugated lining within and adjacent the walls of the cabinet, said corrugated lining constituting a hollow resonator, the cabinet and the corrugated lining having registering openings for the exit of sound, sound reproducing means, and an amplifier communicating with the sound reproducing means and projecting into the hollow resonator.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY C. MILLER.

Witnesses:

WM. F. PALMER,
GEO. P. MULHERN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MECHANICAL REPLAYER,

#1,234,621----Robert G. Brown & J.E.

Strietelmeier,

Patented-July 24th, 1917.

Filed-August 10th, 1916.

R. G. BROWN & J. E. STRIETELMEIER.
MECHANICAL REPLAYER.

APPLICATION FILED AUG. 10, 1916.

Patented July 24, 1917.

2 SHEETS—SHEET 1.

1,234,621.

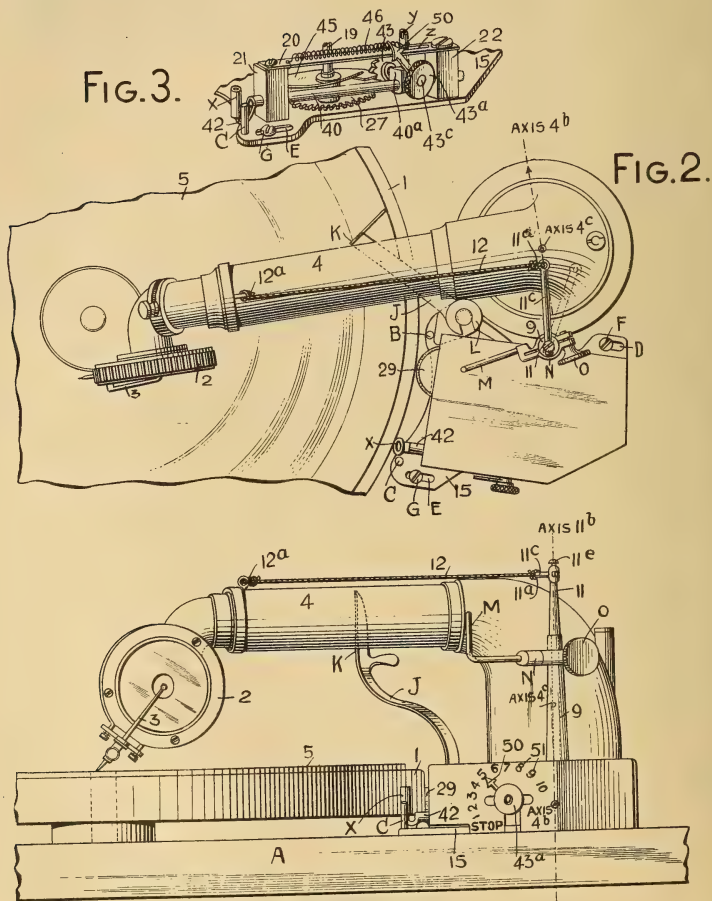


FIG. 1.

Inventors
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MECHANICAL REPLAYER.

APPLICATION FILED AUG. 10, 1916.

Patented July 24, 1917.

2 SHEETS—SHEET 2.

1,234,621.

FIG. 4.

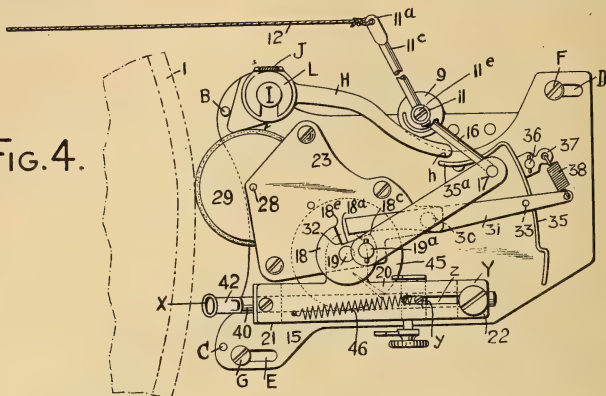


FIG. 5.

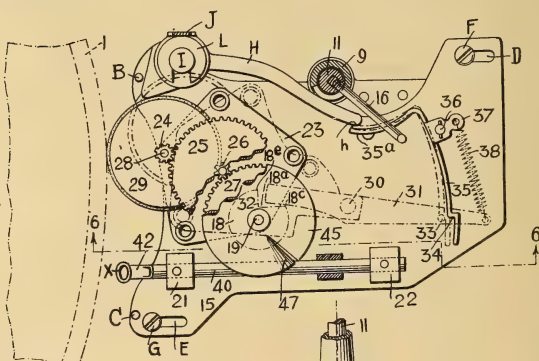
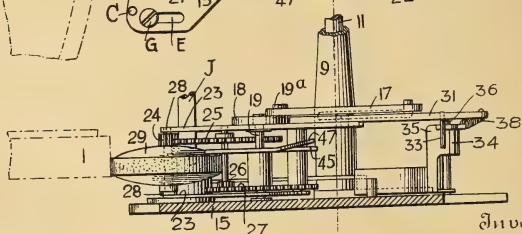


FIG. 6.



Inventor
John E. Strietelmeier
By their Attorney Robert G. Brown
Albert F. Nathan

UNITED STATES PATENT OFFICE.

ROBERT G. BROWN AND JOHN E. STRIETELMEIER, OF ELYRIA, OHIO; SAID BROWN
ASSIGNOR TO SAID STRIETELMEIER.

MECHANICAL REPLAYER.

1,234,621.

Specification of Letters Patent. Patented July 24, 1917.

Application filed August 10, 1916. Serial No. 114,103.

To all whom it may concern:

Be it known that we, JOHN E. STRIETELMEIER and ROBERT G. BROWN, both citizens of the United States, and residing at Elyria, in the county of Loraine and State of Ohio, have invented a new and Improved Mechanical Replayer, of which the following specification is a full disclosure.

This invention deals with phonographs and it proposes an improved re-playing mechanism embodying constructions broadly disclosed and claimed in the co-pending applications of Robert G. Brown, No. 2834, filed January 18, 1915, and the division thereof No. 120,303, filed September 15, 1916.

Heretofore, it has been somewhat difficult for the ordinary purchaser to affix to his phonograph a replaying attachment owing to the fact that its accuracy of operation requires it to be rather precisely located with respect to the turn-table.

A primary object of this invention is to so construct the base of this attachment that the aforesaid locating can be very accurately determined and to provide the base with elements that will practically compel the ordinary purchaser to mount the appliance correctly.

Another object is to devise an appliance particularly adapted for "mail order" sales, and which will be free from elements not ordinarily well understood, such as electrical appliances and which will, in lieu thereof, embody very simple mechanical parts such as mechanical trip devices in place of electrical contact systems which though, perhaps, better may prove more troublesome.

Another object is to simplify the controlling mechanism by utilizing a simple worm and an elementary star wheel coöperating therewith.

Another object is to devise an attachment which can be used in conjunction with phonographs having a tone-arm pivoted by means of a universal joint to the frame of the machine.

Other objects will be in part obvious from the annexed drawings and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relations of the

members and in the relative proportioning and disposition thereof; all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting a preferred form have been annexed, as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:—

Figure 1 is a side elevation of a phonograph embodying this invention and showing the controlling indicator and the tone-arm elevator. Fig. 2 is a plan of the same. Fig. 3 is a fragmentary perspective of the adjustable control. Fig. 4 is a skeleton plan showing particularly the dual-fulcrum control lever. Fig. 5 is a plan with certain overlying elements removed. Fig. 6 is a side elevation as cut off by the line 6—6 of Fig. 5.

This appliance is in the nature of a self-contained unit which is easily attachable to the base-board A of a conventional phonograph adjacent the turn-table thereof so as to utilize the power of the turn-table for shifting the tone-arm. This power is primarily taken off by a friction wheel 29 which is arranged to shift against the turn-table at definite intervals and to be withdrawn at other times. The proper operation of the machine requires that this mounting be performed accurately, and to that end this invention proposes certain unique features of construction of the base plate or casting 15. Thus, this base is provided with two locating pins B and C, which are arranged on either side of the friction wheel 29 and which preparatory to screwing the base 15 to the phonograph board A are intended both to be pressed firmly against the periphery of the turn-table 1.

This base 15 is also provided with two diagonally located slots D and E which are elongated in parallelism and at least one of which is of such length that when the screw F is inserted near its far end, there will be just sufficient play or back-lash to permit the frame 15 to be slipped the proper distance away from the turn-table 1 before the screws F and G are finally tightened up. This arrangement, while exceedingly effective, nevertheless, satisfies all requirements.

This invention contemplates a general mechanism adapted to enter into combination with the above-named conventional elements to function as above stated, and specifically it embraces all or many coördinated sub-combinations including (A) a sound-box lifter, which at appropriate intervals lifts and lowers the stylus; (B) a tone-arm shifter which carries the stylus from the end to the beginning of the record; (C) a motion-transmission which furnishes the necessary gears and shifts resulting in an actuation of the lifter and shifter; (D) a power-connector which is in the nature of a clutch-mechanism and which at appropriate intervals connects the transmission with the primary source of power, which may preferably be the turn-table itself but which may be any motor-driven element; (E) a trip-system which is effective automatically to throw the power-connector into action at the appropriate station in the record; (F) a control-lever which automatically effects a disconnection of the power-connector and normalizes the relation of the trip to the mechanism; (G) an adjuster which predetermines the number of times the mechanism operates to replay the record; and (H) a brake which is conveniently caused to operate to conclude the performance.

The sound-box lifter and tone-arm shifter in this embodiment is compacted and condensed into a single sub-mechanism embodying a tone-arm 4 having rigid therewith a sound-box 2 carrying a stylus 3; the whole being to all intents and purposes a single unit which has a conventional ball and socket mounting at its rear end so as to provide for a horizontal swing about the vertical central axis 4^c and also a vertical swing about the horizontal axis 4^b. This provides all means necessary for a normal playing of the stylus as well as lifting, returning and lowering it. It may be explained that when the tone-arm 4 is lifted to raise the stylus, it must not begin the swing back until the stylus has entirely cleared the record, otherwise it would be scratched. The lifting and shifting means embodies a davit 11 which has its lower end journaled in a hollow post 9 projecting from the base-plate 15 and the upper end of this davit is in the form of an adjustable arm 11^a having an eye 11^a at its extremity to which is attached the cord 12. This arm extends through a hole in the upper end of the davit 11 and a screw 11^a serves to lock it in any desired adjusted position. This hole is sufficiently high to locate the arm 11^a above the tone-arm so that a pull on the cord 12 will lift the tone-arm about its horizontal axis 4^b thus elevating the stylus.

This invention contemplates a means that will come effectively into action only after the stylus has been raised and in this par-

ticular embodiment great simplicity has been attained by intimately incorporating this means with the stylus lifter, and this has been done by a peculiar relation between the axes 11^b and 4^c of the davit and tone-arm, respectively, and the arc of swing of the point 11^a. That is to say, in its normal or stylus-lowering position, the davit 11 is in such a position that the straight line from the point 11^a to the point 12^a is not sufficiently off a "dead center" relation with the axis 4^c to cause the tone-arm to swing, but when the davit 11 swings into its uplifting position, this straight line becomes in a pronounced offset relation with the axis 4^c with the result that a pull on the cord 12 not only tends to lift the stylus but also imposes a sufficient turning movement on the tone-arm to urge it gently yet sufficiently toward its initial position.

The motion transmission is the mechanism or train of elements that results in the actuation of the stylus-replacing means by power derived from some motor-driven part, such as the turn-table 1; and which preferably embodies reduction gears so that the ultimate motion will be slow and deliberate and the stylus will be handled gently and without jerks and thus save the record from scratches. In this embodiment, this transmission is in part stationary and in part is bodily shiftable for power-connecting purposes. The stationary part comprises a shaft 19 pivoted at its lower end in the base of the main frame or casting 15 and at its upper end to the cover-plate 20 which is also fixed to said frame by means of the posts 21 and 22. The upper end of this shaft 19 is provided with an eccentric pin 19^a which is connected with the end of the arm 16 by means of the link 17 whereby the davit 11 may be rocked slowly. This shaft 19 derives motion from the clutch element or wheel 29 through a train of reduction gears 24, 25, 26 and 27, the shafts of which are all pivoted to the side plates 23 of a rocking-frame. Both gear-sets 24-25 and 26-27 have a pronounced reduction effect with the consequence that the crank-pin 19^a is but very slowly turned, although the friction wheel 29 may rotate several times during each revolution of the turn-table.

The power connector is an arrangement in the nature of a clutch and it enables the turn-table to operate during the normal playing of a record without any concomitant operation of the return mechanism. Preferably this means is located so as to disconnect as many parts as possible from the source of motion, to avoid needless wear or noise, and preferably the wheel 29 is therefore entirely withdrawn from the turn-table. This is conveniently done by pivoting the plates 23 of the sub-frame to the shaft 19 so that the shaft 28 of the friction wheel will

be carried by the remote free-swinging portion of the sub-frame.

The position of this sub-frame is in turn determined by the following arrangement:—

5 The lever control for the swinging power-connector functions first to unlatch and resiliently swing the sub-frame to bring the friction-wheel 29 into engagement with the periphery of the turn-table and to maintain
10 this engagement until the tone-arm has been shifted to its initial point, and in the meanwhile to effect a relatching of the control-lever, and then through the same lever to withdraw the friction-wheel and permit the
15 record to be played without interference. This triple action is very easily effected by the multiple-fulcrum lever-system comprising a lever 31 which is permanently pivoted at 30 to the plate 23 of the swinging sub-frame and which (in the position of the part
20 shown by Fig. 2) can (when unlatched) be turned about the stationary fulcrum point 18^a formed by a flat edge of the cam-plate 18. That is to say, the end of the lever 31 has entered
25 a right-angle notch 32 in the cam-plate 18 so that it may rest against the edge 18^a thereof which constitutes a stationary fulcrum enabling the lever 31 at the point 30 to pry the plate 23 around the axis 19. Normally, the lever is held against this movement
30 by means of a pin 33 which engages with a notch 34 of a latch 35 pivoted at 36 to a frame-element and spring-pressed into position by the pull of the spring 38 on the
35 end of the arm 37. The rotation of the cam 18 begins the moment the wheel 29 starts to actuate the davit 11 and this rotation is anticlockwise and immediately brings the raised portion 18^a against the edge of the lever 31
40 so as to force its end away from the shaft 19 and swing the lever about the pivot 30 (the sub-frame remaining still) until the latch pin 33 has passed the notch 34 in the latch 35. This condition remains unchanged
45 while the periphery of the cam-plate 18 rides against the edge of the lever 31 and until the point 18^a passes the end of the lever 31, whereupon the fulcrum provided by the cam 18 will have disappeared and immediately
50 its place is taken by the pin 33 so that the spring now tends to turn the lever 31 around the pin 33 as a fulcrum and this tends to throw the pivotal connection 30 in the opposite direction and, of course, withdraws the
55 sub-frame and the friction wheel 29 so that all motion ceases in the entire attachment. The sub-frame continues to withdraw until the end of the lever abuts the part 18^a again, when the position of Fig. 5 is attained.
60 This action has resulted in an elevation of the stylus, a swinging of the tone-arm, and a replacement of the stylus. Now, the stylus is in a position to replay the record and will continue to do so until a trip system comes
65 into effect to release the latch 35 and cause

the attachment to refunction in restoring the stylus to its initial position.

The trip system is entirely mechanical in this embodiment and it proposes an element
such as the arm H pivoted about the pin I 70 and having a contact surface *h* adapted to bear up against the arm 35^a extending from the latch 35 so as to swing the latch to release the pin 33. This arm H is frictionally
75 clutched to a trip lever J which extends underneath the tone-arm and rises on the other side thereof so as to provide a contact surface K which will be abutted by the tone-arm and cause the arm H to operate the latch. A
80 spring washer L is seated in a circumferential slot near the end of the post I and compresses the arms J and H together (the friction disk being interposed) with just sufficient
85 force to permit of an easy adjustment of the trip arm K by the hand and yet to transmit without slipping enough pressure to throw the latch. In this way the latch
90 may be caused to operate at any predetermined limiting of the stroke of the tone-arm 4, with the result that the tone-arm is up-
95 lifted and permitted to swing in an anticlockwise direction. This movement is in turn limited by a stop consisting of an L-shaped rod M secured to a flat collar N
which can be clamped in any angular ad-
justment to the post 9 by the thumb screw O.

The adjuster operates to determine the number of times the record will automatically
re-play and it comprises a spiral track and a tooth element restrained against displace- 100
ment thereby. This spiral track may be very simply formed of a flat disk 45 of metal affixed to the shaft 19 and cut radially so
as to provide a displaced nose 47. With this
105 coöperates a star wheel in turn controlling the operation of the brake. This star wheel 43 (see Fig. 3) is carried by a short shaft 43^a journaled in a block 40^a affixed to the
shiftable brake-rod 40. A thumb screw 43^a enables this shaft to be turned and a pointer 110
50 coöperating with indications 51 shows the effect of the adjustment. The brake-rod 40 is shiftable mounted at its ends in posts 21
and 22 and its forward extremity is up-
turned and provided with a rubber tubing 115
acting as a friction surface *a*, and the rod is prevented from turning about its own axis
by a stem *y* protruding through the slot *z* in the plate Y secured to the posts 21 and 22.

The operation of this device will be easily 120
understood from this description since each revolution of the worm 45 will turn the star wheel through one notch and when there are
no more teeth to be passed there will be
nothing to restrain the spring 46 from 125
throwing the brake against the turn-table and stopping all further action of the phonograph. It is to be noted that the star wheel
is merely in the form of a segment and not a
complete circle, and that as soon as the last 130

tooth has been passed the cut-away portion of the star segment can simply slip under the worm and move forward.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed this invention, we claim as new and desire to secure the following combinations of steps and elements, or equivalents thereof, by Letters Patent of the United States:—

1. A unitary self-contained attachment for a conventional phonograph combining means for raising, shifting and lowering the stylus to its starting station; mechanism driven by a motor-driven part of the phonograph for actuating said means repeatedly to automatically replay the selection; a mechanical trip actuated by the movement of the stylus; and a hand-adjustable indicator for causing said mechanism to function successively the predetermined number of times and automatically stop.

2. An instrumentality affixable to render a phonograph automatically replayable and combining a frame attachable near the turn-table and having two positioning points co-operating therewith; means providing a limited displacement of said frame; a wheel adapted to be driven by the turn-table; means carried by said frame for raising and lowering the stylus of the phonograph; latch-mechanism adapted to be tripped at a predetermined station of the stylus to utilize said wheel in transmitting power to said means to enable it slowly to raise and lower said stylus; and means for automatically normalizing said latch mechanism and concluding the operative relation between said turn-table, said wheel and said means.

3. A re-playing attachment combining a frame having two positioning surfaces adapted to be abutted against the turn-table and also having slots elongated in parallelism adapted to receive attaching screws, said screws affording a limited withdrawal of said frame to give the cord relation with the turn-table; and stylus returning mechanism carried by said frame.

4. A phonograph re-player combining an automatic returning mechanism; a worm rotated thereby; a brake element normally urged into its arresting position; a rotatable segment having teeth engaging said worm and constructed to be released thereby to permit the operation of said brake.

5. In a phonograph re-player; a first shaft; a disk thereon having offset edges; a second shaft extending transversely thereto; a toothed segment thereon engaging the edge of said disk; and a brake positioned by said brake segment.

6. In a phonograph re-player; an up-standing post; an arm horizontally adjustable therein and extending over the tone-arm of the phonograph; a cord connecting the forward end of said tone-arm with said arm; and automatic means for swinging said arm about said vertical post to raise and shift the tone-arm.

7. A phonograph brake-device combining a turn-table and a stylus; a mechanism for repeatedly lifting said stylus; a mechanical trip for actuating said mechanism; a spring-pressed brake; and an adjustment for causing said brake to function after said stylus has been uplifted for the predetermined number of times.

8. A phonograph brake-apparatus combining a frame adapted to be mounted adjacent a conventional turn-table; a brake-element movably mounted on said frame to engage and arrest the turn-table; means also on said frame adapted to cooperate in lifting a conventional stylus; mechanism adapted to derive motion from the periphery of said turn-table for operating said means and said brake-elements; and a mechanical trip for actuating said mechanism.

9. A phonograph brake-apparatus combining a frame adapted to be mounted adjacent a conventional turn-table; a brake-element movably mounted on said frame to engage and arrest the turn-table; means also on said frame adapted to cooperate in lifting a conventional stylus; mechanism embodying gearing adapted to derive motion from said turn-table for operating said means and said brake-element; a mechanical trip for actuating said mechanism; and means for automatically interrupting the propelling relation between said turn-table and said mechanism.

10. A phonograph brake-apparatus combining a frame adapted to be mounted adjacent a conventional turn-table; a brake-element movably mounted on said frame to engage and arrest the turn-table; means also on said frame adapted to cooperate in lifting a conventional stylus; clock-work mechanism adapted to derive motion from said turn-table for operating said means and said brake-element, said mechanism being so related to the stylus lifting means as to operate it before releasing the brake element; and a mechanical trip for actuating said mechanism.

11. A phonograph brake-apparatus combining a turn-table; a brake for arresting it; a clockwork mechanism for automatically causing said brake to function after

a predetermined number of table rotations; a mechanical trip for actuating said mechanism; and an adjustment rendering said mechanism operative on said brake only after the expiration of a multiple of said predetermined number of table rotations.

12. A phonograph brake-apparatus combining a stylus and turn-table; mechanism embodying a system of gearing for transmitting power for repeatedly lifting said stylus; a mechanical trip for actuating said mechanism; means for connecting said mechanism to derive motion from the source of power operating the turn-table and adapted automatically to disconnect the same after a predetermined number of stylus uplifts; and a spring-pressed brake for automatically stopping said turn-table after a predetermined time.

13. A phonograph brake-apparatus combining a turn-table; a clock-work device adapted to be operated by motion derived from the source of power actuating the turn-table; latch-mechanism for automati-

cally establishing a propelling relation between said power and said mechanism; and a spring-pressed brake caused to stop said turn-table after said mechanism has been in operation for a considerable length of time.

14. A phonograph brake-apparatus combining a turn-table; a swinging tone-arm; a stylus supported thereby; a clock-work mechanism for repeatedly lifting said stylus and returning said tone-arm; a mechanical trip for actuating said mechanism; a brake adapted to be functioned by said mechanism; and an adjustment for causing it to operate said brake after any predetermined number of repeated performances.

In witness whereof, we hereunto subscribe our names, as attested by the two subscribing witnesses.

ROBERT G. BROWN.

JOHN E. STRIETELMEIER.

Witnesses:

FLORENCE E. MOORE,

EVA K. ARTZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

STOP MOTION.

1,234,772 ----- J. Kiewicz,
Patented July 31, 1917.
Filed Feb. 29, 1916.

STOP MOTION.

1,234,772.

Fig.1.

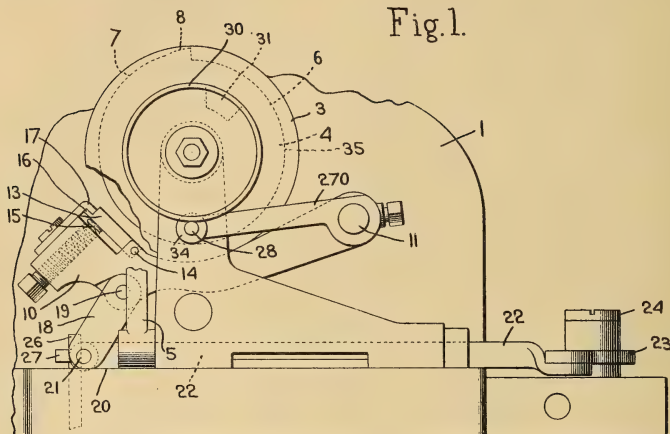


Fig.2.

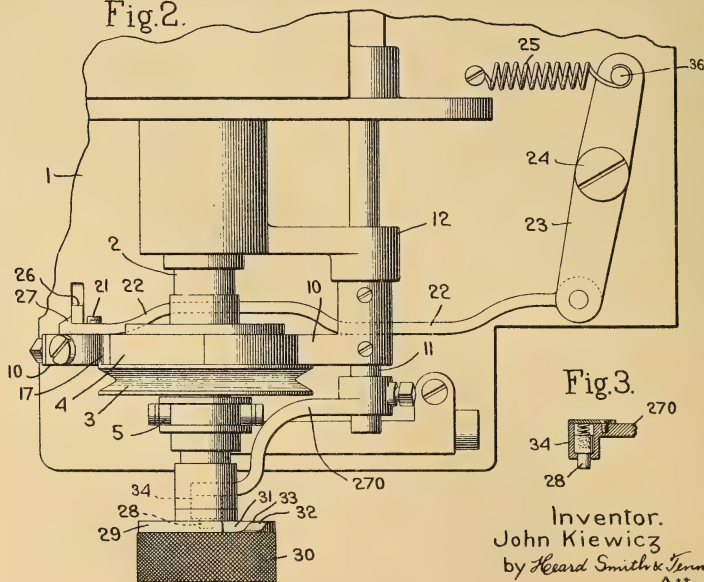


Fig.3.

Inventor.
John Kiewicz
by Heard Smith & Tennant.
Attys.

UNITED STATES PATENT OFFICE.

JOHN KIEWICZ, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE REECE BUTTON HOLE MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

STOP-MOTION.

1,234,772.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed February 29, 1916. Serial No. 81,252.

To all whom it may concern:

Be it known that I, JOHN KIEWICZ, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented an improvement in Stop-Motions, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to stop motions such as are used in connection with machines of various types for bringing the parts to rest when the driving clutch or other driving element is disengaged, and the objects of the invention are to provide a novel stop motion which is comparatively noiseless in its operation and which brings the driven element to rest with a cushioned movement and without any sudden jar or blow, and which also is accurate and positive in its operation, and which has other advantages, all as will be more fully hereinafter set forth.

In order to give an understanding of my invention, I have illustrated in the drawings a selected embodiment thereof which will now be described, after which the novel features will be pointed out in the appended claims.

Figure 1 is a side view of a stop motion embodying my invention;

Fig. 2 is a top plan view;

Fig. 3 is a sectional view through the end of the arm 270.

My improved stop motion is adapted for use on a great variety of different machines, such, for instance, as sewing machines, different kinds of machines for making shoes, etc., where it is desirable to bring the parts to rest quickly and in a predetermined position when the driving clutch is disengaged, and as my invention is capable of use with such a wide variety of machines, I have not illustrated herein any complete machine, but have merely shown at 1 a portion of a machine equipped with my improved stop motion. 2 indicates the driving shaft of the machine which may be driven from a driving element of any suitable or appropriate construction. As illustrative of one

well-known form of driving element, I have shown a driving pulley 3 which is loosely mounted on the shaft 2 but is adapted to be clutched thereto or unclutched therefrom by any well-known clutch mechanism. The driving pulley 3 may form one of the clutch elements, and in the illustrated embodiment of the invention, the other clutch element is shown at 4. The clutch pulley 3 is moved into and out of clutching engagement with the clutch member 4 by means of a clutch actuator 5 that may be operated in any suitable way. The parts as thus far described are or may be of any suitable construction and form no part of my present invention.

For convenience I will hereinafter refer to the shaft 2 as the driven member because it is the member which is driven from the driving element 3.

My improved stop motion is constructed to co-act with the driven member 2 to bring it to rest with a cushioned movement and without any of the jar or shock which is a necessary incident to some stop motions.

My improved stop motion comprises a rotary brake member which is rigid with the driven member and which is provided with an eccentric or cam-shaped braking surface, and which will, therefore, be hereinafter referred to as the brake cam, a cooperating brake member adapted to be moved into and out of engagement with said brake cam and a strut member by which the brake member is given its movement, said strut member operating not only to force the brake member into engagement with the brake cam, but also to lock it in such position. The brake cam is herein shown as constituted by the driven clutch member 4, the latter having its peripheral face shaped to present an eccentric braking surface. This member 4 is shown as having a peripheral face presenting the concentric portion 6 which merges into the eccentric or cam portion 7, the latter having at its end a more or less abrupt rise 8. The brake member which coöperates with this brake cam is in the form of an arm 10 rigidly mounted on a rock-shaft 11 that is journaled in suitable bearings 12 carried by the machine 1. This brake member is pro-

vided with a friction block 13 that is adapted to engage the periphery of the brake cam 4 when the brake member is thrown into its operative position. The friction block 13 will preferably be yieldingly sustained by the brake member 10, this being herein accomplished by pivoting said block to the brake member, as at 14, and providing a spring 15 against which the block 13 rests, and which forms a yielding backing therefor. The block 13 is provided with a lip 16 which is adapted to engage a keeper 17 in the form of a hooked member secured to the end of the brake member 10, said keeper limiting the outward movement of the block. It will be noted that the rock-shaft 11 is at one side of the shaft 2 so that swinging movement of the arm or brake member 10 about the shaft 11 will move the friction block 13 into or out of engagement with the periphery of the brake cam 4. For thus moving the brake member into operative engagement with the brake cam, I have provided a strut member 18 which is pivoted to the brake member 10 at 19 and one end of which has sliding engagement with an abutment surface 20 formed on the machine 1. The strut member 18 is of such length and shape that it normally stands at an angle to the abutment surface 20, as shown in Fig. 1. With this construction it will be seen that if the lower end of the strut member 18 is moved to the right, Fig. 1, the brake member 10 will be forced upwardly, thereby bringing the friction block 13 into engagement with the periphery of the brake cam, and the construction is such that when the brake member is in operative engagement with the brake cam, the strut member will stand at substantially right angles to the abutment face 20 and will thus positively lock the brake member in its operative position.

Various devices may be employed for giving the strut member this movement by which the brake member is forced into its operative position. In the construction shown, the lower end of the strut member has a link 22 pivoted thereto at 21, which link is connected at its rear end to a lever 23 pivoted to the machine 1 at 24 and acted upon by a spring 25. The link 22 is normally held in its forward position shown in the drawing thereby holding the strut in its inoperative position, this being accomplished by means of a latch 26 which is adapted to engage a shoulder 27 formed on the link 22. When the latch 26 is released, the spring 25 will move the link 22 to the right, Figs. 1 and 2, thereby moving the lower end of the strut member on the abutment surface 20 and causing the brake member to be thrown into engagement with the brake cam. So long as the brake member engages the concentric portion 6 of the brake cam, it will

have merely a braking effect upon the driven element, but when the eccentric portions 7, 8 of the brake cam come into engagement with the brake member, then a wedging action will take place which brings the driven element to rest with an easy gradual movement and without any shock. The yielding friction block 13 also adds to the cushioned effect of the stopping movement. The construction of the parts is such that the abrupt or high portion 8 of the surface of the brake cam cannot pass the friction block 13 so that the driven element will always be brought to rest at a predetermined point in its revolution.

I have also provided herein means which permit the movement of the brake member from its inoperative to its operative position only when the driven element is in a predetermined angular position. For this purpose I have provided an arm 270 fast to the rock-shaft 11 and which carries at its end a pin or projection 28 that is adapted to bear on a track 29 formed on the head 30 that is rigid with the driven shaft 2. This head 30 is cut away at one point, as at 31, and is also provided with the inclined face 32 which extends from the bottom of the cut-away portion to the side face 33 of the head 30. When the parts are held in their inoperative position by the latch 26, the brake member 10 is held out of engagement with the brake cam and the projection 28 on the arm 270 is also held out of engagement with the track 29. When the latch 26 is released the spring 25 will tend to move the link 22 to the right, Fig. 1, and this movement will operate through the strut 18 to lift the brake member 10 upwardly. Such upward movement, however, is prevented by the engagement of the pin 28 with the track 29. When during the continued rotation of the driven element 2 the notch or cut-away portion 31 is brought into alignment with the pin 28, then the spring 25 acts to move the strut 18 to the right, Fig. 1, and force the brake member 10 upwardly into engagement with the brake cam and also carry the pin 28 into the cut-away portion 31. The pin 28 is yieldingly mounted in the end 34 of the arm 270, as shown in Fig. 3, and as the head 30 continues to rotate, the inclined wall 32 engages the end of the pin 28 and forces the latter backwardly, said pin then moving over the face 33 of the head. The notch 31 is so positioned relative to the eccentric portions 7 and 8 of the brake cam 4 that said notch comes into alignment with the pin 28 just after these eccentric portions of the brake cam have passed the friction block 13. As a result, when the stop motion is operated, the friction block 13 of the brake member is brought into engagement with the concentric portion 6 at about the point 35, and the driven element will, therefore, be sub-

jected to a braking effect for a predetermined portion of a revolution before the eccentric portions of the cam member cooperate with the brake member to bring the parts to rest. Therefore, the brake member will always be brought into operative engagement with the brake cam at a predetermined point in the revolution thereof, regardless of the position of the parts when the latch 26 is released.

This latch 26 may be released by hand or automatically by the machine after a certain cycle of operations, depending on the character of the machine with which the stop motion is used, and as the particular way of releasing the latch forms no part of my present invention I have not deemed it necessary to illustrate herein any particular mechanism for this purpose.

When the machine is to be set in operation again, the strut member 18 may be restored to its inoperative position shown in Figs. 1 and 2 by any suitable means, and as illustrative of one device which might be used for this purpose, I have shown a handle 36 connected to the lever 23. It will be understood, of course, that the driving pulley 3 must be unclutched from the driven element before or at the time that the latch 26 is released, and the latch and clutch mechanism may if desired be connected so as to operate in unison.

While I have illustrated herein a selected embodiment of my invention, I do not wish to be limited to the constructional features shown.

I claim:

1. In a stop-motion, the combination with a driven member, of a brake cam rigid therewith and having an eccentric braking surface, a brake member mounted to swing into and out of engagement with said brake cam, a strut member pivotally connected to the brake member, an abutment surface with which the end of the strut member has sliding wedging engagement, and means to move the strut member on the abutment surface in a direction to force the brake member into engagement with the brake cam.

2. In a stop motion, the combination with a driven member, of a brake cam rigid therewith, a brake member mounted to swing into and out of engagement with said brake cam, a strut member pivotally connected to the brake member, an abutment surface extending at an angle to the normal position of the strut member and with which the end of the strut member has sliding engagement, and means to move the strut member on said abutment surface in a direction to force the brake member into engagement with the brake cam.

3. In a stop motion, the combination with a driven member, of a brake cam rigid therewith, a brake member mounted to

swing into and out of engagement with said brake cam, a strut member pivotally connected to the brake member, an abutment surface extending at an angle to the normal position of the strut member and with which the end of the strut member has sliding engagement, and means to move the strut member on the abutment surface into a position at substantially right angles thereto thereby to force the brake member into engagement with the brake cam and to lock the brake member in such position.

4. In a stop motion, the combination with a driven member, of a brake cam rigid therewith, a brake member mounted to swing into and out of engagement with the brake cam, a strut member pivotally connected to the brake member, an abutment surface against which the end of the strut member has sliding engagement, means to move said end of the strut member along the abutment surface in a direction to cause said strut member to force the brake member into engagement with the brake cam, and means to permit such movement of the strut member only when the driven member is in a predetermined angular position.

5. In a stop motion, the combination with a driven member, of a brake cam rigid therewith, a brake member mounted to swing into and out of engagement with the brake cam, an abutment surface extending substantially parallel to the brake member, a strut member pivotally connected to the brake member and having one end in sliding engagement with the abutment surface, and means to move said strut member on the abutment surface whereby the strut member has a wedging action to force the brake member into engagement with the brake cam.

6. In a stop motion, the combination with a driven member, of a brake cam rigid therewith, a brake member mounted to swing into and out of engagement with the brake cam, an abutment surface extending substantially parallel to the brake member, a strut member pivotally connected to the brake member and having one end in sliding engagement with the abutment surface, means to move said strut member on the abutment surface whereby the strut member has a wedging action to force the brake member into engagement with the brake cam, and means to prevent such movement of the strut member except when the driven member is in a predetermined angular position.

7. In a stop motion, the combination with a driven member, of a brake cam rigid therewith and having an eccentric braking surface, a brake member mounted to swing into and out of engagement with said brake cam, a strut member pivotally connected to the brake member, an abutment surface

with which the end of the strut member has sliding wedging engagement, means to move the strut member on the abutment surface in a direction to force the brake member into engagement with the brake cam, an arm rigid with the brake member, and means rigid with the driven member and

coöperating with said arm to hold the brake member out of engagement with the brake cam except when the driven member is in a predetermined position.

In testimony whereof, I have signed my name to this specification.

JOHN KIEWICZ.

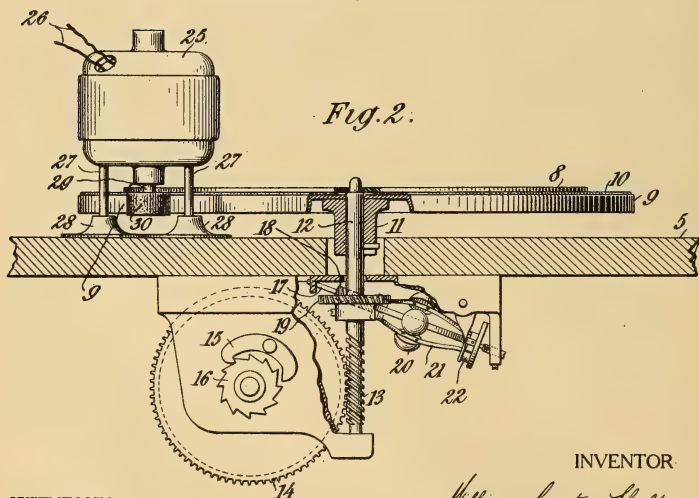
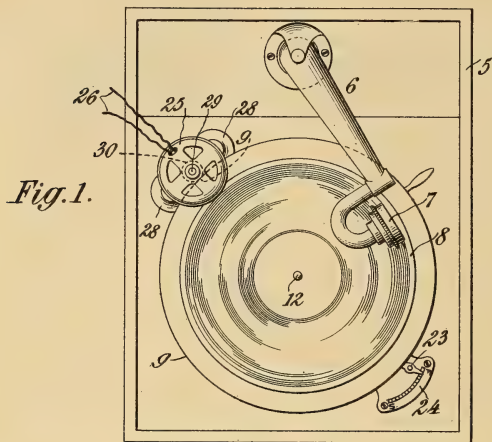
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE MOTOR,
#1,234,811-----W.G.Shelton,
Patented-July 31st, 1917.
Filed-September 23rd, 1915.

W. G. SHELTON.
TALKING MACHINE MOTOR.
APPLICATION FILED SEPT. 23, 1915.

1,234,811.

Patented July 31, 1917.



WITNESSES:
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William Gentry Shelton
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UNITED STATES PATENT OFFICE.

WILLIAM GENTRY SHELTON, OF NEW YORK, N. Y.

TALKING-MACHINE MOTOR.

1,234,811.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed September 23, 1915. Serial No. 52,255.

To all whom it may concern:

Be it known that I, WILLIAM GENTRY SHELTON, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Talking-Machine Motors, of which the following is a specification.

This invention relates to a mechanism for driving the record of a talking machine independently of the motor of such machine. It is particularly adapted for a spring operated machine, the object of the invention being to provide a simple and inexpensive device for electrically driving a talking machine equipped with a spring motor.

In the drawings accompanying this specification, one practicable embodiment of the invention is illustrated, in which drawings—

Figure 1 is a top view of a form of talking machine having applied thereto in operative relation, a form of my improved motor; and

Fig. 2 is an enlarged view, being a cross section of portions of the devices illustrated in Fig. 1, and illustrating my motor in elevation.

My improved motor is designed especially in the form illustrated in the drawings to drive the record disk supporting platen of a talking machine by tractive force, in this illustration applied to the periphery of such platen, and during this drive utilizing the existing governor connected with a spring driven motor. In many instruments of this character the platen may be driven forward independently of the spring motor, particularly when the spring is run down, but such independent rotation is, nevertheless, controlled by the governor. My improved motor may be applied and the record properly driven so that the speed imparted to the record will be governed by means of the existing governor.

In the example illustrated in the drawings 5 is a supporting table carrying an oscillatory arm 6 provided at its end with a known form of sound box 7 carrying the needle for traversing the spiral groove upon the record 8, which record in the present illustration is a disk. The record disk is shown disposed in a substantially horizontal plane and resting upon a rotary supporting platen 9. In the present illustration this rotary platen carries upon its upper surface a felt disk 10 for protecting the under side of the record disk when this is provided

upon both sides with records, and also for exerting a certain amount of friction between the disk and platen so that the disk will move with the platen. The platen 9 is shown provided with a hub 11 mounted upon an upright shaft 12 which is rotated by means of the spring motor, the shaft being provided at its lower end with a worm 13 engaged by a worm wheel 14 driven from the spring motor by means of some suitable train or connection. Part of such train or connection comprises a pawl and ratchet mechanism, the pawl and ratchet being designated by the reference characters 15, 16, whereby by means of this connection the platen may readily be driven forward independently of the spring, particularly when the spring is run down.

The speed of the platen 9 in the illustration is controlled by means of a governor applied to the shaft 12. The shaft 17 of the governor is shown provided with a worm 18 meshing with a worm wheel 19 fast upon the shaft 12. The governor in the present instance comprises a suitable brake controlled by means of balls and spring arms 20, 21. The governor is operated from some convenient part of the machine by means of an operating device 22 which is set by a lever 23 having a pointer running across an index 24.

It is to be understood that the foregoing mechanism is illustrated and described as a convenient example of a spring driven motor controlled talking machine.

As above stated, the platen 9 of the talking machine, which supports the record, may be driven forward independently of the spring motor of the machine, and this usually without disconnecting any of the parts other than such disconnection as is permitted by the clutching mechanisms normally present in the machine. In many of the spring driven talking machines the governor is so situated that it controls the speed of the platen, whether this is driven forward by the spring of the motor of the machine, or whether the forward movement is effected independently thereof. Such is the case in the mechanism illustrated herein.

My improved motor takes advantage of the two facts above noted, namely, the capability of independent forward movement of the platen, and the governor control of such independent movement. The illustrated form of my motor comprises an elec-

trical motor 25. This motor is of some suitable construction, preferably high speed for giving sufficient power when reduced, and is supplied by current in some convenient manner, as for instance, by wires 26.

The casing of the motor is shown provided with dependent legs 27, the lower end of each of which is provided with a soft rubber foot 28. These rubber feet are preferably of considerable area, having thin edges and thickened hub portions which engage the legs. By this means the motor is provided with an elastically yieldable base. The shaft 29 of the motor is shown provided with a pulley 30 for engaging the periphery of the record supporting platen 9.

The yieldability of the supporting base 28 permits of the driving pulley 30 of the motor having secure and sufficient tractive engagement with the platen for driving this forward without slipping. Owing to undulations in movement, or eccentricity of the platen relative to its shaft, or the journals of the shaft of the talking machine, a certain amount of yieldability of the driving pulley of the motor toward and from the platen is essential and is permitted by means of the construction above described. The tractive engagement and the yieldability of the parts is enhanced by constructing the pulley 30 of some very elastic material, and any shocks or jars incident to operation are also largely minimized by such construction. A good material for the pulley 30 is sponge rubber.

The illustrated form of my motor, which may well be termed an independent talking machine motor, is particularly designed for use in connection with those forms of talking machines wherein the record supporting or rotating platen is controlled by a governor.

It is obvious that various changes may be made in the construction within the scope of the claims without departing from the spirit of the invention.

What I claim is:—

1. The combination with a frame having a horizontally rotatable member of a portable driving means therefor, comprising a supporting member, and a motor member mounted thereon and having a substantially vertically extending shaft provided with a drive means on its lower end portion which rotatively engages the rotatable member, said driving means being removably frictionally maintained in its driving position.

2. The combination with a frame having a horizontally rotatable member, of a portable driving means therefor, comprising a supporting member having a lower yielding frame engaging portion, a motor member mounted thereon and having a substantially vertically extending shaft projecting downwardly therefrom, and a drive wheel formed

of a yielding material mounted on the lower end portion of the shaft and frictionally and drivingly engaging the rotatable member, said driving means being removably frictionally maintained in its driving position.

3. The combination with a sound reproducing machine provided with a turntable and a spring motor for rotating the same, of a portable supplemental driving means therefor, comprising a supporting member, an electric motor member mounted on the supporting member and having a substantially vertically extending shaft projecting downwardly therefrom, and a drive wheel mounted on the lower end portion of the shaft and frictionally and drivingly engaging the periphery of the turntable, said driving means being removably frictionally maintained in its driving position.

4. The combination with a talking machine, comprising a record support, a spring motor for driving the support, a clutch mechanism between said spring motor and the support whereby the said support may run forward independently of the said spring, a governor for controlling the forward movement of the said support, of an independent motor comprising an electric motor and means carried thereby for engaging the said support and driving the same forward.

5. An independent talking machine motor, comprising an electric motor, an elastically yieldable base therefor, and a pulley for engaging the record support of a talking machine.

6. An independent talking machine motor, comprising an electrical motor, an elastically yieldable base therefor, and an elastically yieldable pulley for engaging the record support of a talking machine.

7. An independent talking machine motor, comprising an electric motor having a base for resting upon some portion of the talking machine, and an elastically yieldable pulley carried by the motor shaft for engaging the record support of said talking machine.

8. A device of the character specified, comprising an electric motor having a casing, a pair of legs depending from the casing, elastically yieldable feet at the lower ends of said legs, an elastically yieldable pulley mounted on the shaft of the motor and disposed between said legs.

9. The combination with a sound reproducing machine, provided with a turntable, of a driving means therefor, comprising a supporting member having a part for resting upon some portion of such machine, an electric motor member connected to the supporting member to yieldingly swing relatively to the said part for resting upon the machine, the said motor having a drive

wheel mounted thereon and frictionally and drivingly engaging the periphery of the turntable, said support being adapted for yieldingly holding the drive wheel in engagement with the turntable and frictionally maintaining said driving means in its driving position.

10 10. The combination with a sound reproducing machine, provided with a turntable, of a driving means therefor, comprising a supporting member having a part for resting upon some portion of such machine, an electric motor member connected to the supporting member to yieldingly swing relatively to the said part for resting upon the machine, the said motor having a substan-

tially vertically extending shaft projecting downwardly therefrom, and a drive wheel mounted on the lower end portion of the shaft and frictionally and drivingly engaging the periphery of the turntable, said support being adapted for yieldingly holding the drive wheel in engagement with the turntable and frictionally maintaining said driving means in its driving position. 20 25

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM GENTRY SHELTON.

Witnesses:

CHAS. LYON RUSSELL,
GUSTAVE R. THOMPSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

COUNTERBALANCE,
#1,235,041,-----Charles P. Marshall,
Patented-July 31st, 1917.
Filed-Dec. 11th, 1916.

C. P. MARSHALL.
COUNTERBALANCE.
APPLICATION FILED DEC. 11, 1916.

1,235,041.

Patented July 31, 1917.

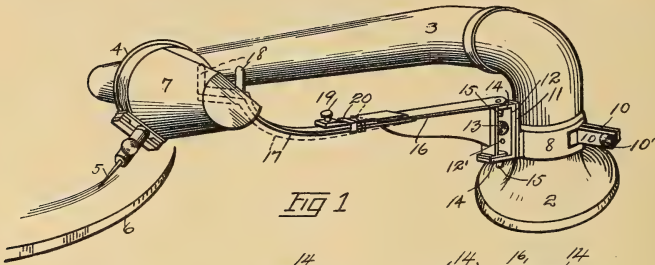


Fig 1

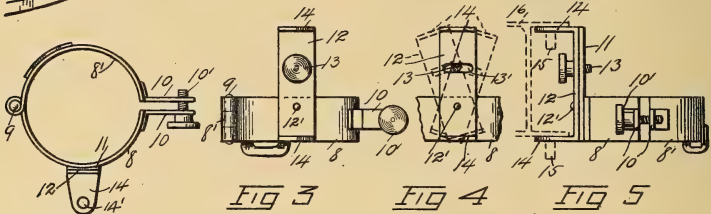


Fig 2

Fig 3

Fig 4

Fig 5

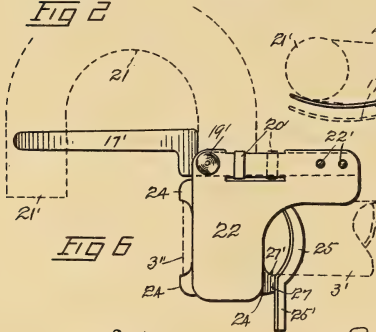


Fig 6

Fig 7

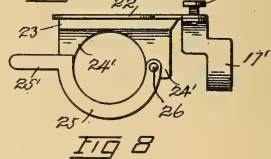


Fig 8

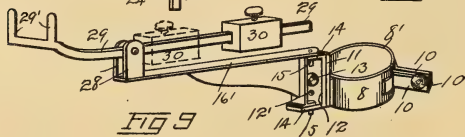


Fig 9

WITNESS
Clark M. Gray,

INVENTOR.
Charles P. Marshall,
BY *Harry D. Wallace*
ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES P. MARSHALL, OF WATERTOWN, NEW YORK.

COUNTERBALANCE.

1,235,041.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed December 11, 1916. Serial No. 136,168.

To all whom it may concern:

Be it known that I, CHARLES P. MARSHALL, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Counterbalances, of which the following is a specification.

This invention relates to counter-weights or weight compensators designed for attachment to phonographs or talking machines, to relieve the extra pressure of the needle on the record and to give poise and balance to the sound-box or reproducer under certain conditions when in operation.

The object of the invention is to provide a weight compensator for talking machines and the like, especially of the disk or flat record type to overcome, counter-balance, or relieve the weight of extra mechanisms or appliances which may be associated with the sound-boxes or reproducers, or to such related parts as the tone-arm, goose-neck and the like parts of said machines. A particular object is to provide a counter-balance to compensate or offset the weight of tone purifiers, such as described and shown in United States Patent No. 1199197, dated September 26, 1916, in order that the tonal effect of the purifier may not be impaired by the mechanical noises caused by the extra pressure of the needle on the record, and also to permit the reproducers of talking machines to perform their natural and desired functions.

I attain these objects by the means set forth in the detailed description which follows, and as illustrated in the accompanying drawing, in which—

Figure 1 is a perspective view of the tone arm of a well-known type of phonograph to which one form of my counter-balances is applied. Fig. 2 is a top-plan view of the clamping member of the counter-balance. Fig. 3 is the front elevation of the same. Fig. 4 is a broken elevational view; showing the adjustable support for the counter-balance. Fig. 5 is a side elevation of the same. Fig. 6 is a top-plan view of a modified form of counter-balance for supporting the goose-neck of Victrola talking machines. Fig. 7 is an end view of the same. Fig. 8 is a rear-side elevation of the same. Fig. 9 is a modification of the counter-balance shown in Fig. 1.

In Figs. 1 to 5 inclusive of the drawing, 2

represents the stationary base which supports the movable tone arm 3 of the phonograph. 4 is the transmitter or reproducer which is attached to the said arm, 5 the needle which traverses the revolving record 6, and 7 represents a "tone purifier" constituting an additional weight applied to the reproducer 4, which calls for a suitable compensating means not contemplated by the manufacturers of the talking machines, which will now be described.

8—8' represent similar members of a band-like clamp, which are hinged at 9 for spreading apart when applying the clamp to the base 2, the said parts having corresponding radial lugs 10, which are pierced by a screw 10' for holding the clamp in place. The member 8 is provided with a rigid upright part 11, to which is pivoted a support 12 the latter being adjustable on a pivot 12' to the extent allowed by a pin or screw 13 carried by the part 11 and which plays in a slot 13' in the part 12 (see Fig. 4). The support 12 has outwardly extending top and bottom lugs 14, having alining perforations 14', to receive corresponding pins or pintles 15 carried by a swinging arm 16 (see full and dotted lines in Figs. 1 and 5). The support 12 is rendered adjustable, as shown, for the purpose of permitting the arm 16 to automatically adjust itself or conform to the position of the tone arm 3, so as not to cramp or exert undue strain on the movable tone arm. The counter-balance or weight compensator proper consists of a spring 17, which is secured to one end of a swinging arm or support 16, the other end of said spring having an upturned fork 18, which engages the underside of the tone arm 3 adjacent the reproducer 4. The swinging arm 16 and the spring 17 are movable as one part, and are disposed directly beneath the tone arm 3, and the said spring is bent upwardly at its forked end and therefore exerts its tension for upholding the reproducer and tone arm, thereby compensating or balancing any extra weight that may be applied to the reproducer (as the tone purifier 7). 19 represents an adjusting screw carried by the outer end of the swinging arm 16, by means of which the tension of the spring may be varied for balancing different weights. The full and dotted lines in Fig. 1 show how the position of the spring 17 may be varied by means of the screw 19. For extra heavy weight the spring is allowed to exert its full

power, as shown by full lines in Fig. 1, while for lighter weights the spring is depressed through the medium of the screw 19, as described. The adjustment of spring 17 is further effected by a sliding band or ring 20 which encircles the spring and the free end of arm 16. The full and dotted lines in Fig. 1 show the adjustable nature of the band 20.

For the well-known Victrola talking machines a slightly modified counter-balance is required: Referring to Figs. 6, 7, and 8, the dotted lines 21 represent the outline of the usual goose-neck which is pivoted to the tone arm 3' on the free end 21' of which a reproducer like the part 4 may be applied. The counter-balance consists of the spring 17', the curved free end of which passes beneath the free end of the goose-neck 21, while the opposite end of said spring is riveted or otherwise rigidly secured to the underside of a supporting-plate 22, as at 22'. The support 22 is provided on its underside with a saddle 23, which rides upon the portion 3'' of the tone arm, and 24—24' represents spring claws or clips which partially encircle and grip the portion 3'' for holding the support 22 in place. To further secure the support 22, I provide a throat-latch 25, which is pivoted to one of the claws 24', as at 26. The opposite end of the latch comprises a handle 25'. The latch 25 is also provided with a tooth 27, which engages a similar tooth 27' carried by the other claw 24' for holding the latch in closed position beneath the tone arm 3', as shown in Figs. 7 and 8. A screw 19' carried by the supports 22 is employed for depressing the free end of the spring 17', for reducing its power for lifting the goose-neck for compensating for lighter weights which may be applied to the said part. The full and dotted lines in Fig. 7 show how the spring 17' may be adjusted by the use of the screw 19'. An adjusting band or ring 20' encircles the spring 17' and a portion of the plate 22 and is

slidable toward and from screw 19' for further varying the tension or power of the said spring.

In Fig. 9 is shown a modification of the counter-weight illustrated in Fig. 1, wherein a swinging arm 16' is provided with a pair of lugs 28, between which is pivoted a lever 29 having at one end a fork 29' for engaging the underside of a tone arm (as 3), while the other end portion is provided with a weight 30, which is slidable toward and from the pivot point, as shown by full and dotted lines in Fig. 9, for balancing heavier or lighter weights. The forked end 29' of the lever 29 may or may not be flexible like the springs 17—17'.

In Figs. 1, 6, and 7 I have shown the springs 17—17' applying their tension or power to the tone arms, but it is understood that the said springs may engage the reproducers or other related parts and perform the same functions or services.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In a counter-balance for phonographs, the combination with the movable tone arm, of a spring having a free end adapted to engage and to counter-act the weight of the tone arm, a support for the other end of said spring, means for depressing the spring for lessening the tension thereof, and means comprising a sliding-ring for varying the power of the spring.

2. In a weight compensator for talking machines, the combination with the tone arm, of a rigid support secured to a portion of said arm, means for adjusting said support so that its movement may correspond to the movements of the tone arm, a balancing spring secured to said support and exerting its power for uplifting the free end of the tone arm, and means for increasing and decreasing the power of said spring.

In testimony whereof I affix my signature.

CHARLES P. MARSHALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ELECTRIC MOTOR DRIVE.

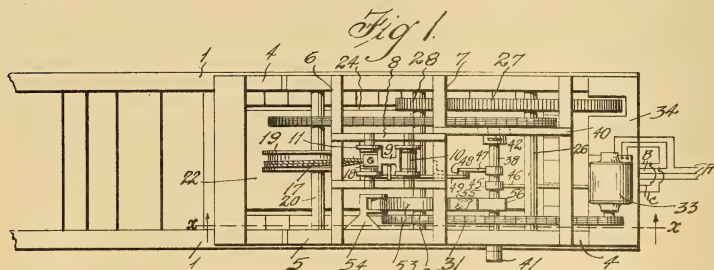
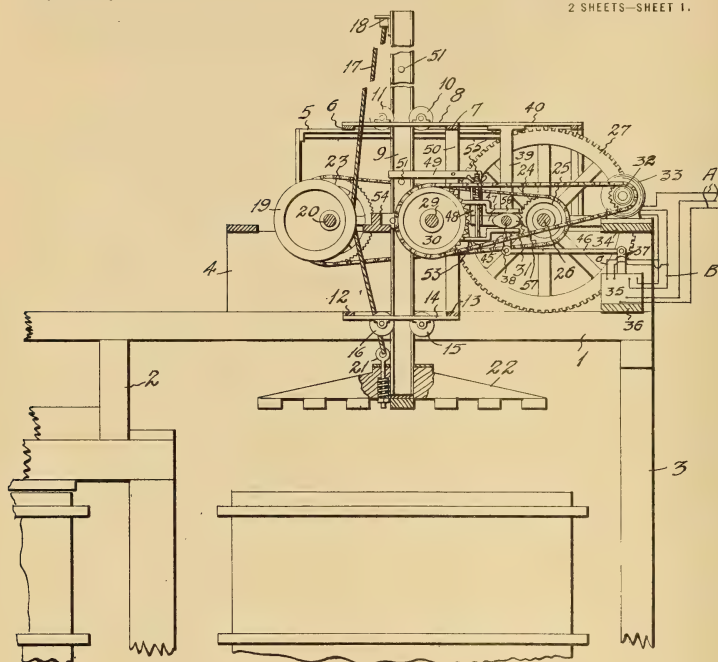
1,235,087 ----- J. E. Whitt,
Patented July 31, 1917.
Filed April 12, 1915.

J. E. WHITT.
ELECTRIC MOTOR DRIVE.
APPLICATION FILED APR. 12, 1915.

1,235,087.

Patented July 31, 1917.

2 SHEETS—SHEET 1.



INVENTOR
J. E. WHITT.

Fig. 2.

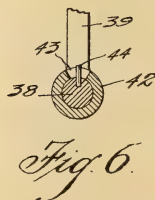
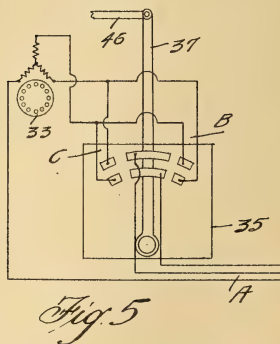
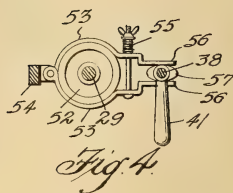
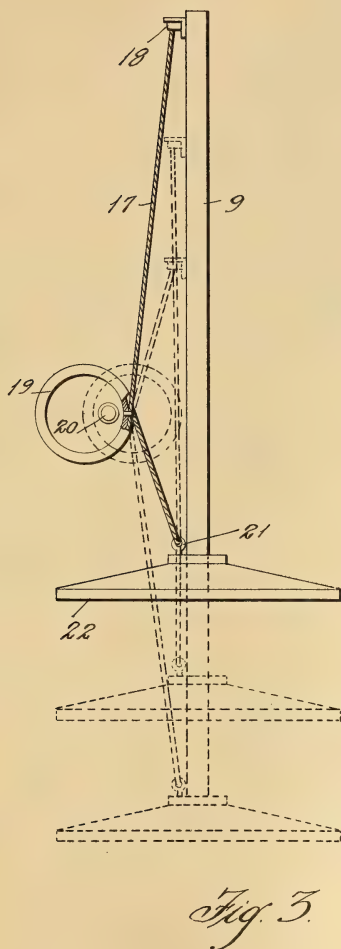
BY *Jack H. Schuy.*
ATTORNEY

J. E. WHITT.
ELECTRIC MOTOR DRIVE.
APPLICATION FILED APR. 12, 1915.

1,235,087.

Patented July 31, 1917.

2 SHEETS—SHEET 2.



INVENTOR
J. E. WHITT.
BY *Jack H. May*
ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH E. WHITT, OF ITALY, TEXAS.

ELECTRIC-MOTOR DRIVE.

1,235,087.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed April 12, 1915. Serial No. 20,744.

To all whom it may concern:

Be it known that I, JOSEPH E. WHITT, citizen of the United States, residing at Italy, in the county of Ellis and State of Texas, have invented certain new and useful Improvements in Electric-Motor Drives, of which the following is a specification.

This invention pertains to improvements in electric motor drives. The purpose of the invention is to provide an electric motor drive particularly adapted for use in connection with a cotton trampler.

In carrying out the invention a driving device of the unit type has been provided and includes mechanism for automatically reversing the motor drive by reversing the motor itself.

Another object of the invention resides in means coöperating with the motor for increasing the application of power to the trampler head as the same approaches the lower end of its stroke, thus increasing the pressure exerted by the trampler head on the cotton proportionate to the resistance offered by the latter; whereby a substantially uniform load is placed on the motor.

A still further object is to provide a manually operated switch arranged to reverse the motor so that the trampler head may be carried up and down rapidly and at will; and also the provision of automatic means for operating said switch and stopping the motor at each end of the stroke of the trampler head in case the operator should fail to do so manually.

Another object of the invention is to provide a controlling device for the motor switch having a normally neutral position at which the motor is idle; and also provision of means for arresting and holding the trampler stationary in the position which it occupies when the controlling device is moved to neutral, but constructed to release the trampler head when said device is moved into one of its operative positions.

A further object of the invention is to provide a device of the character described that will be strong, durable, and efficient, and comparatively inexpensive to construct, simple to operate, and one in which the several parts will not be likely to get out of working order.

With the above and other objects in view the invention has relation to certain novel features of construction and operation, an example of which is described in the follow-

ing specification and illustrated in the accompanying drawings, wherein:

Figure 1 is a view of a portion of a cotton baling press with portions in elevation and section and showing in section the trampler apparatus herein described, said latter section being taken on the line $x-x$ of Fig. 2,

Fig. 2 is a plan view of the same,

Fig. 3 is a diagrammatical view of the trampler head indicating the positions of the eccentric drum at each end of the stroke,

Fig. 4 is a detail of the brake mechanism,

Fig. 5 is a diagrammatical view of the switch and motor circuits, and

Fig. 6 is a sectional detail of the control shaft stop.

In the drawings the numeral 1 designates the trampler sills which are supported on up-rights 2 and 3. On the sills 1 a pair of metal beams 4 are secured longitudinally of the sills. The entire tramping apparatus is mounted on and carried by these beams and thus may be installed on any make of cotton press.

A super frame 5 is mounted on the beams 4 and carries cross bars 6 and 7 which support at right angles bars 8. A vertically disposed plunger 9 is confined against lateral displacement between the bars by guide rollers 10 and 11 mounted on the bars 8 and engaging the plunger on opposite sides. The guide rollers are flanged as shown, there being one roller 10 and a pair of rollers 11, the latter being separated. At the bottom of the beams cross bars 12 and 13 are mounted similar to the bars 6 and 7 and support bars 14 at right angles similar to the bars 8. Guide rollers 15 and 16 engage opposite sides of the plunger, there being a pair of rollers 16 and a single roller 15.

A cable 17 has one end secured to a bracket 18 fixed to the upper end of the plunger 9. This cable extends down and is coiled around a drum 19 eccentrically fixed on a shaft 20 suitably mounted on the beams 4. The cable is attached at a proper point to the drum so as not to slip. The same cable passes off of the drum and is carried down to an eye bolt 21 yieldably mounted in the trampler head 22 carried by the plunger 9. The rollers 11 and 16 are arranged in separated pairs to permit the free passage of the cable, and the yieldable eye bolt connection is provided to compensate any overthrow of the drum when the trampler head has reached the limit of its upward stroke.

By observing Figs. 1 and 3 it will be noted that when the tramper head is at the center of its stroke the drum 19 is positioned so that the cable 17 is unwinding from the "high" side or at its point of least leverage.

When motion is imparted to the drum and the plunger is started down at its slowest speed, the drum being at its point of greatest leverage the cable is unwinding from the "low" side. The speed is gradually increased so that at the center of the down stroke the greatest speed is attained and the cable is paying off the "high" side as indicated in dotted lines in Fig. 3. After passing the center point the speed is gradually decreased but the power applied is increased, the maximum being reached when the "low" side of the drum is reached at which point the plunger and tramper head will be at the end of the down stroke. By this arrangement the power is increased by increasing the leverage and in proportion to the increase of the resistance offered by the cotton being packed; thereby permitting the use of a motor of minimum horse-power, as very little if any extra horse-power will be required from the motor when the "peak" of the load is reached. It is apparent that without this mechanism or its equivalent the motor would be subjected to an unequal load and would not operate satisfactorily.

The shaft 20 is driven by a large sprocket 23 fixed thereon and which is driven by an endless chain 24 passing about a smaller sprocket 25 fixed on a counter shaft 26 suitably mounted in bearings on the beams 4. A large gear 27 is fixed on the shaft 26 and meshes with a pinion 28 fixed on a drive shaft 29 suitably mounted in bearings on the beams 4. A large sprocket wheel 30 is fixed on the drive shaft and is driven by an endless chain 31 passing about the smaller sprocket 32 attached direct to the shaft of a motor 33. By observing Fig. 1 it will be evident that quite a speed reduction is had by the gearing arrangement just described. This is necessary in order to operate the tramper head at a comparatively slow rate of speed and use a direct motor drive.

In tramping cotton in a press box the tramper head 22 is vertically reciprocated and where a motor is employed means for reversing said motor as well as automatically stopping it must be employed. The motor 33 is of the 3-phase type and is mounted on a cross plate 34 connecting the beams. Below the plate 34 a double-throw oil switch 35 of approved construction is mounted on a cross plate 36 extending between the beams 4 as shown in Fig. 1. In Fig. 5 a diagrammatical view of the switch and motor circuits are shown in which A designates the power circuit which leads to the poles of a switch lever 37. A motor circuit B leads from contacts on one side of

the switch lever to the motor; while a reversed circuit C leads from contacts on the opposite side of said lever to the motor. Normally the lever 37 occupies an intermediate or neutral position whereby the motor is idle and it is obvious that when said lever is swung to one side the motor will be energized and when swung in the opposite direction the first circuit will be broken and the circuit on the other side closed whereby the motor is reversed, but should the lever be arrested after breaking either contact the motor will stop.

For operating and controlling the switch a controlling device is provided. This device comprises a rock shaft 38 having its inner end bearing in a hanger 39 depending from a bar 40 carried by the super frame 5. The forward end of the shaft projects over the front beam 4 and has fixed thereon a depending lever 41 by which the shaft may be manually rocked. As shown in Figs. 2 and 6 the hanger 39 has a collar 42 provided with an arcuate slot 43 into which a pin 44 projects from the shaft 38. It is obvious that the ends of the slot 43 limit the rocking movement of the shaft 38. An arm 45 is fixed on the rock shaft and depends therefrom in line with the lever 41. A link 46 is pivotally connected to and extends between the lower end of the arm 45 and the upper end of the switch lever 37. The operator by grasping the lever 41 and swinging the same rocks the shaft 38 and through the agency of the arm 45 and link 46 throws the lever 37 of the switch 35 into engagement with one of the contacts and closes one of the circuits whereby the motor is energized, the motor being reversed by swinging the lever 41 in the opposite direction.

When the motor is energized motion is transmitted to the drum 19 through the gearing herein before described and the plunger 9 reciprocated by the cable 17 whereby the tramper head 22 packs the cotton in the press box thereunder. It is obvious that automatic means must be provided for stopping the motor at each end of the stroke of the plunger 9, because should the operator not swing the lever 41 at the proper time the plunger would continue to travel and tear up the machine. For accomplishing this an arm 47 fixed on the shaft 38 projects horizontally from the same and has pivotal connection at its outer end with the lower end of a link 48 pivoted at its upper end to a horizontal lever 49 which is mounted on an upright 50 extending between the cross bars 7 and 13 as shown in Fig. 1. The lever 49 extends across the plunger 9 in the path of pins 51 projecting from said plunger. These pins are positioned so as to engage the lever 49 at the extremities of the plunger stroke. Referring to Fig. 1 it will be seen that if the rock

shaft is swung so that the arm 45 is moved to the right and the motor circuit B closed the free end of the lever 49 will be swung up and motion imparted to the parts so that the plunger 9 will be carried downward. When the tramper head reaches the extremity of its downward stroke should the operator forget or fail to swing the lever 41 to reverse the motor the upper pin 51 would engage the free end of the lever 49 and force it downward whereby the shaft 38 would be rocked and the switch lever swung to its neutral position and the motor stopped. It is obvious that should the operator attempt to swing the lever 41 so as to swing the lever 37 back into the same contact he would be unable to do so as the pin 51 locks the lever 49 against upward movement; thus the lever 41 can only be swung to the other contact whereby the motor is reversed and the plunger started on its upward stroke.

It will be apparent that some means for holding the tramper head in the position at which it is arrested when the motor is stopped, must be provided. For this purpose a brake-wheel 52 is fixed on the drive shaft 29. A pair of hinged brake shoes 53 surround the wheel and are pivoted on a bracket 54 projecting from one of the beams 30. The shoes are connected by a spring tension device 55 which causes them to normally bind on the wheel and hold the shaft 29 against rotation whereby the tramper head 22 is held in its arrested or suspended position. A pair of jaws 56 extend from the brake shoes and embrace a double-face cam 57 fixed on the rock shaft 38. When the rock shaft is swung in either direction the cam spreads the jaws 56 thus spreading the brake shoes and releasing the wheel 52 and the shaft 29. The brake acts when the motor is idle, but is released simultaneously with the energizing of the motor. When the switch 35 is "neutral" the brake is holding the tramper head by restraining the gearing, and when the switch is "thrown" by swinging the lever 41, the brake is released. It will be observed that the brake is applied when either of the pins 51 stop the motor.

The operation of the apparatus is the same as in all trampers; the cotton being fed to the press box and the lever 41 being swung to start the motor and reverse it to reciprocate the tramper to pack the cotton in the press box. The mounting of the motor directly on the tramper gives a unit power drive which is both economic and desirable.

The invention is presented as including all such modifications and changes as fall within the scope of the appended claims.

What I claim, is:

1. The combination of a reciprocating member, a driving member connected with the reciprocating member for reciprocating the latter, an electric motor connected with the driving member for operating the latter, a reversing switch normally neutral and connected in the power circuit of the motor, a manual operating device connected with the switch, and means on the reciprocating member for engaging the switch operating device at each end of the stroke of said reciprocating member.

2. The combination of a reciprocating member, a driving member connected with the reciprocating member for reciprocating the latter, an electric motor connected with the driving member for operating the latter, a reversing switch normally neutral and connected in the power circuit of the motor, a manual operating device connected with the switch, means on the reciprocating member for engaging the switch operating device at each end of the stroke of said reciprocating member, a brake for arresting the motion of the reciprocating member, and means on the switch operating device for operating the brake.

3. The combination of a reciprocating member, a driving member connected with the reciprocating member, an electric motor connected with the driving member, a reversing switch connected in the power circuit of the motor, a switch operating device, a hand operated element connected directly with the switch operating device, and means mounted on the reciprocating member positioned so as to operate the switch operating device at each end of the stroke of said member.

4. The combination with a reciprocating member and an electric motor for driving the member, of a reversing switch connected in the power circuit of the motor, a switch operating member, a hand lever mounted on the operating member, a brake correlated with the reciprocating member, a brake operating device connected with the switch operating member, emergency stops at each end of the reciprocating member, and an operating connection in the path of the stops and connected with the switch operating member, the switch operating member being operatable by either the hand lever or the emergency connection and the brake operating device being operated whenever the switch operating member is actuated.

In testimony whereof I affix my signature.

JOSEPH E. WHITT.

STYLUS,

#1,235,154-----James W. Owen,
Patented-July 31st, 1917.
Filed-July 22nd, 1912.

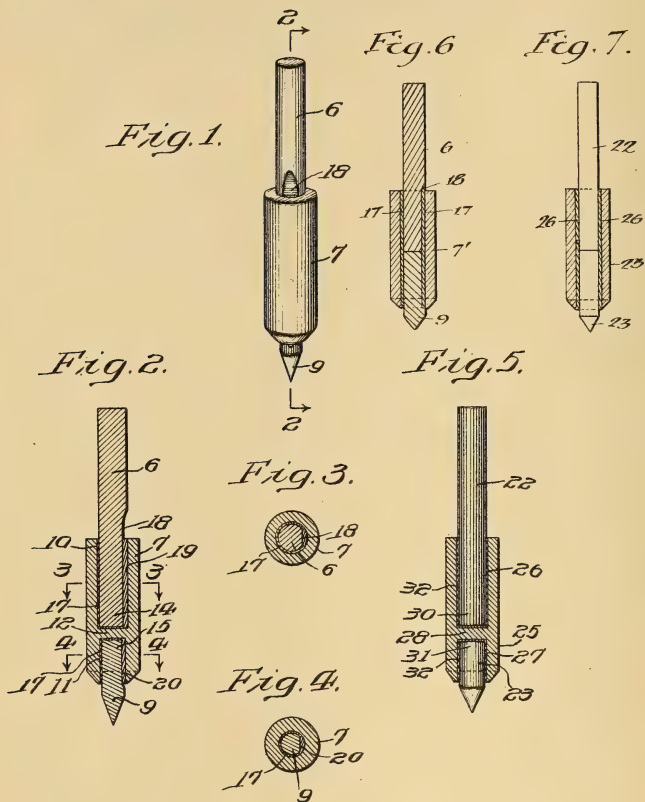
J. W. OWEN & A. HEWITT.

STYLUS,

APPLICATION FILED JULY 22, 1912.

1,235,154.

Patented July 31, 1917.



WITNESSES

H. J. Hartman.

Clifton C. Hallowell

INVENTORS

James W. Owen,
Albert S. Hewitt.

Wm. H. Voss,

ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES W. OWEN, OF LANSDOWNE, PENNSYLVANIA, AND ALBERTIS HEWITT, OF CAMDEN, NEW JERSEY, ASSIGNORS TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

STYLUS.

1,235,154.

Specification of Letters Patent. Patented July 31, 1917.

Application filed July 22, 1912. Serial No. 710,741.

To all whom it may concern:

Be it known that we, JAMES W. OWEN, a citizen of the United States, and a resident of Lansdowne, in the county of Delaware, State of Pennsylvania, and ALBERTIS HEWITT, a citizen of the United States, and a resident of Camden, in the county of Camden, State of New Jersey, have invented certain new and useful Improvements in Styli, of which the following is a specification, reference being had to the accompanying drawing.

This invention particularly relates to styli which may be operatively connected to vibrate the diaphragm of a sound reproducing device, when coöperatively engaged with a sound record, to effect the reproduction of recorded sound waves, or to styli adapted to be employed in connection with a recording device, and is especially directed to that class of styli which are provided with separate stylus points formed of wear-resisting material suitable to withstand the wear incident to their coöperation with a sound record tablet.

We are aware that means have been proposed for the purpose of absorbing such vibrations as tend to effect the production of undesirable or extraneous sound, due principally to the contact of the stylus point with the surface of the sound record tablet, and that styli having the shank formed of fibrous material and provided with a point formed of a relatively hard substance, capable of resisting wear, have been employed for this purpose. It is believed, however, that no attempt has heretofore been made to effect such refinement by providing a stylus with a shank of hard material, such as steel, and a point of a relatively harder wear-resisting material, such as a jewel, joined in integral relation by a coupling of relatively pliant resilient material.

The principal objects of this invention, broadly defined, are to provide a stylus that will combine the advantages of the steel stylus with the advantages incident to a stylus having a shank formed wholly of such material as will tend to reduce or subdue vibrations which produce undesirable or extraneous sound; to provide a sound reproducing stylus, having a shank comprising regions of different rigidity respectively formed of materials of relative resili-

ency, with a stylus point member formed of a substance of such hardness and wear-resisting qualities as will substantially withstand any tendency to change its form incident to its coöperation with the undulatory surfaces of the grooves of a sound record; to provide a stylus that may be continuously employed without injury to the sound record with which it coöperates; and to provide a stylus that will tend to refine the reproduction of the recorded sound waves and enhance the quality of the reproduction, by eliminating certain extraneous sounds, without very materially affecting the volume.

Other objects of this invention, are to provide a stylus, having a separate shank and point member, with a separately formed coupling of resilient material, joining said shank and point member together, and having means to determine the volume of tone produced by said stylus thus formed; and to provide said shank and point member with a flattened side or a groove forming a recess for permitting the escape of cement from the sockets in said coupling when said shank and point member are forced therein.

Another object of this invention, specifically stated, is to provide a stylus with a coupling formed of bakelite embracing the opposed ends of said shank and point member, and including an adhesive bakelite cement operative to coalesce said parts together and to form an integral composite structure having distinct regions of relative hardness and resiliency.

Further objects of this invention are, to provide a stylus having a separate shank and point, with a separately formed coupling of resilient material whose natural shrinkage may be utilized to integrally connect said shank and point, and form a stylus structure having relatively resilient regions; and to provide said coupling with an intervening web forming a cushion interposed between the opposed ends of said shank and point.

This invention also comprehends the method of producing styli which consists in forming a socketed coupling of bakelite or equivalent material, inserting a shank member and a point member in the respective sockets provided therefor in said coupling with a suitable adhesive cement, and

backing the stylus structure thus formed, to coalesce said parts into a composite integral body.

This invention further includes the method of producing styli which consists in forming a socketed coupling of soluble material, such as celluloid, coating the surfaces of a shank member and point member with a suitable solvent, and inserting said shank member and point member in the respective sockets provided therefor in said coupling.

Briefly stated, the preferred embodiment of this invention, hereinafter described, comprises a stylus having a shank preferably formed of steel, and a separate reproducing point member formed of a jewel or other suitable hard substance, such as tantalum, iridium, etc., connected with said shank by a separate collar, preferably formed of bakelite, celluloid, or other suitable resilient material, having suitable sockets for the reception of the opposed ends of said shank and point member, which may be rigidly secured therein by a suitable cement or solvent, and which are preferably provided with a flattened side forming a recess or groove for the convenient escape of the cementing agent.

This invention further embodies all of the various novel features of construction and arrangement hereinafter more definitely specified.

In the accompanying drawing, Figure 1 is a perspective view of a stylus showing the preferred embodiment of this invention; Fig. 2 is a central longitudinal sectional view of the stylus shown in Fig. 1, taken on the line 2-2 in said figure; Fig. 3 is a transverse sectional view, taken on the line 3-3 in Fig. 2; Fig. 4 is a transverse sectional view, similar to Fig. 3, taken on the line 4-4 in Fig. 2; Fig. 5 is a longitudinal sectional elevation of a modification of the invention shown in Figs. 1 to 4, inclusive, and Figs. 6 and 7 are views similar to Figs. 2 and 5 of modified forms of the invention of this application.

Referring to Figs. 1 to 4 of the drawing, the shank 6, which is preferably formed of steel, is conveniently connected, by the interposed coupling 7, with the point member 9, formed of a jewel or other suitable wear-resisting substance, such as tantalum, iridium, etc. Said coupling 7 is preferably formed of bakelite or other equivalent material, and is provided with sockets 10 and 11, respectively arranged to receive the shank 6 and jewel point member 9 snugly fitted therein, and with the web 12 interposed between the opposed ends 14 and 15 of the shank 6 and jewel point member 9, respectively, the distance between said opposed ends being conveniently regulated by varying the thickness of the web 12, where-

by the tone of the stylus when assembled may be predetermined, it being obvious that a reduction of the thickness of the web 12 will increase the rigidity of the stylus and cause the stylus to produce a relatively loud tone, while any increase in the thickness of said web will similarly decrease the rigidity of said stylus and cause it to produce a softer tone.

As best shown in Fig. 2 of the drawing, the shank 6 and jewel joint member 9 are preferably retained in their respective sockets 10 and 11 by a suitable adhesive cement 17, preferably composed of bakelite, which may coalesce said coupling 7, shank 6, and jewel point member 9 together, to form an integral composite stylus, by baking the assembled structure in a temperature preferably about 250 degrees F.

Although the spaces between the shank 6 and surface of the socket 10, and between the jewel point member 9 and the surface of the socket 11 are shown in Fig. 2 greatly exaggerated, for convenience of illustration, it is to be understood that said shank 6 and jewel point member 9 preferably fit their respective sockets snugly, the diameters of said sockets being preferably about .001 of an inch greater than the diameters of the respective members to be fitted therein.

As best shown in Fig. 2 of the drawing, the shank 6 has one side cut away longitudinally to form a groove or recess 18, which cooperates with the surface of the socket 10 to provide a channel 19, when said shank is forced into said socket, for the convenient escape of the surplus cement therefrom. Likewise, the jewel point member 9 is similarly provided with a cut away portion forming a groove or recess 20, for the escape of surplus cement from the socket 11 when said member is forced therein.

In the form of this invention shown in Fig. 5, the stylus may be provided with a shank 22, formed of steel or other suitable material, which may be connected with a point member 23, formed of a jewel or other suitable wear-resisting substance, such as tantalum, iridium, etc., by a coupling 25, preferably formed of celluloid or equivalent material, having the socket 26 arranged to receive the shank 22, and the socket 27 arranged to receive the point member 23, and having a web 28 interposed between the opposed ends 30 and 31 of the shank 22 and jewel member 23, respectively.

It may be here noted that the properties of celluloid are such, that when its surface is coated with a suitable solvent, such as amyl-acetate, said surface and the adjacent underlying portion tend to swell, or, in other words, appear to be released from compression.

In this form of the invention, the peculiar properties of the celluloid above noted may

be advantageously utilized by employing an adhesive cement 32, formed of celluloid dissolved in a suitable solvent, such as amyl-acetate, for holding the shank 22 and the jewel point member 23 in their respective sockets 26 and 27, it being noted that in addition to said shank and jewel point member being held by said cement, they are also held by the expansion of the surfaces of the sockets, which will effect a pressure upon said shank and point member and grip them with such tenacity as to prevent their accidental displacement, and consequently form a permanent composite integral stylus structure.

Although in each of the forms of this invention shown in the drawing the coupling is provided with a web between the opposed ends of the shank and jewel point member, it is to be understood that said web may be omitted and the shank and jewel member abutted.

In Figs. 6 and 7 are illustrated structures similar to those shown in Figs. 2 and 5 but in which the webs 12 of Figs. 2 and 28 of Fig. 5 are omitted. In other words, the coupling 7' shown in Fig. 6 has a suitable opening extending throughout the length of it and the opposed ends of the shank 6 and the jewel point 9 abut each other, the shank and jewel point being retained in the coupling 7' by suitable cement 17.

In the modification shown in Fig. 7, the coupling 25' is of celluloid similar to the coupling 25 shown in Fig. 5 but the hole extends throughout the length of the coupling and within it are secured the shank 22 and the hard point 23 by means of the application to the interior of the opening of a solvent of celluloid which causes the adjacent portion of the coupling 25' to swell and grip the shank and hard point firmly within the same, the adjacent ends of the shank and stylus point abutting against each other. In other respects the structure is similar to that shown in Fig. 5.

It may be observed that a stylus structure as herein contemplated is advantageous, in that the yielding connection between the shank and its point member comprises a comparatively small portion of the length of the stylus, whereby the tone producing qualities of the steel stylus may be combined with the means for providing a region of relative resiliency for refining the tones produced thereby. Furthermore, the resiliency of said shank and its point member may be varied either by varying the thickness of the web of the coupling interposed between the opposed ends of the shank and the point member, or by varying the diameter of said coupling without varying the diameters of the shank or point member.

It has been common practice to vary the tone of reproducing styli by varying the

diameters of their respective shanks. Thus, it will be readily seen that it is only the styli having shanks of the larger diameter that actually fit the socket in the stylus bar or holder. In styli constructed in accordance with this invention, however, the respective shanks of different tones styli may be of a uniform standard diameter, substantially equal to the diameter of the socket in the stylus bar or holder of a sound reproducer, and, therefore, may be readily fitted in said socket and rigidly secured to said bar or holder in any suitable manner.

It is well known that wherein styli having points which may be readily worn by their contact with a sound record disk are employed, it is necessary to replace a stylus after the reproduction of each sound record, in order to prevent injury to the records, caused by the cutting action of the sharp edges of the worn stylus point on the angular corners of the undulatory walls of the groove.

By the employment of such a stylus as herein contemplated, it will be obvious that the inconvenience of replacing a new stylus after the reproduction of each record will be obviated; and that by reason of the fact that the point is not substantially worn by its contact with the record, the reproduction throughout will be of a uniform quality.

In reproducing recorded sound waves, much depends in the quality of the reproduction upon the rigidity of the connected parts, especially the stylus, which necessarily vibrates many times per second, the frequency, of course, depending upon the tones to be produced, and, therefore, it is essential that the coupling be formed of such a material as may be coalesced with the shank and point member to provide a connection that will tightly hold the opposed ends of said members together with such tenacity as to form an integral stylus structure.

It is not desired to limit this invention to the precise details of construction and arrangement herein set forth, as various modifications may be made therein without departing from the essential features of the invention as defined in the appended claims.

Having thus described our invention, we claim:

1. A stylus comprising a shank, a record engaging member, and a coupling more flexible than said shank into which the adjacent ends of said shank and member are inserted and by which they are united, said adjacent ends of said shank and member being spaced from each other longitudinally whereby a transverse section of said stylus between said shank and said member will pass through said coupling only.

2. A stylus comprising a relatively stiff metal shank substantially cylindrical in cross-section, a stylus point substantially

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cylindrical in cross-section and a non-metallic coupling having substantially cylindrical sockets into which the adjacent ends of said shank and said stylus point are permanently secured, said coupling being more flexible transversely than said shank.

3. In a stylus the combination of a steel shank, a wear-resisting record-engaging tip and a coupling permanently securing said shank and tip together, said shank and said tip being spaced apart from each other and said coupling being of non-metallic material whereby said shank and said tip are substantially sound-insulated from each other.

4. A stylus comprising a shank formed of steel, a jewel point, and a coupling formed of bakelite for joining said shank and point together, and having suitable sockets therefor in which they are retained by a suitable adhesive cement.

5. A stylus comprising a shank formed of steel, a jewel point, and a coupling formed of bakelite for joining said shank and point together, and having suitable sockets therefor in which they are retained by bakelite adhesive cement.

6. A stylus comprising a shank formed of steel and having a portion flattened longitudinally, a jewel point having a portion flattened longitudinally, a coupling formed of bakelite and having sockets for said shank and jewel, separated by a web forming a cushion interposed between the opposed ends of said shank and jewel, and cement in said sockets for retaining said shank and jewel therein, said flattened portions affording means of escape for the surplus cement when said shank and jewel are inserted in said sockets.

7. A stylus comprising a coupling formed of bakelite, having alined sockets separated by a web of predetermined thickness, a jewel point snugly fitted in one of said sockets and engaged therein by a suitable adhesive cement, and a shank snugly fitted in the other of said sockets and engaged therein by an adhesive cement, the opposed

ends of said shank and jewel being in abutted relation with said web. 50

8. A stylus comprising a coupling formed of bakelite having alined sockets, a jewel point having a flattened side snugly fitted in one of said sockets and retained therein by adhesive bakelite cement, and a shank having a flattened side and formed of steel snugly fitted in the other of said sockets and retained therein by adhesive bakelite cement, the said flattened sides affording channels for the escape of the surplus cement. 60

9. A stylus comprising a relatively stiff metal shank, a record engaging point member and a non-metallic coupling, said coupling being provided with sockets into which the ends of said record engaging member and shank are tightly fitted, said sockets being of substantially the same shape in transverse cross-section as the shape of said shank and said record engaging member are in transverse cross-section respectively, and said coupling being more flexible than said shank or record engaging member. 70

10. A stylus comprising a relatively stiff metallic shank, a record engaging point member in axial alinement therewith, and a non-metallic coupling more flexible than said shank into which the adjacent ends of said shank and record engaging member are permanently and rigidly inserted and by which they are united, said adjacent ends of said shank and record engaging member being spaced from each other longitudinally whereby a transverse section of said stylus between the adjacent ends of said shank and record engaging member will pass through said relatively flexible coupling only. 85

In witness whereof, we hereunto set our hands this 19th day of July, A. D., 1912.

JAMES W. OWEN.
ALBERTS HEWITT.

Witnesses:

FRANK B. MIDDLETON, Jr.,
JOHN D. MYERS.

PHONOGRAPHIC DISK RECORD HOLDER,
#1,235,362-----M. G. Nelles,
Patented-July 31st, 1917.
Filed-February 21st, 1916.

1,235,362.

FIG. 1

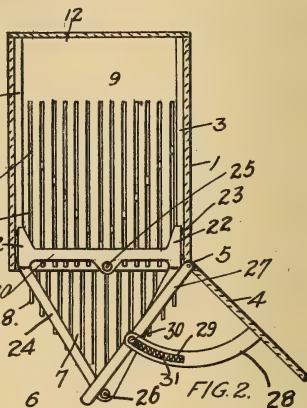


FIG. 2.

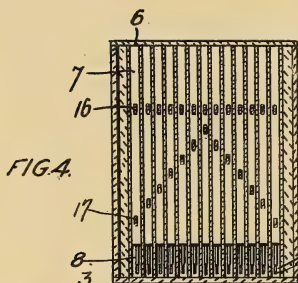


FIG. 4.

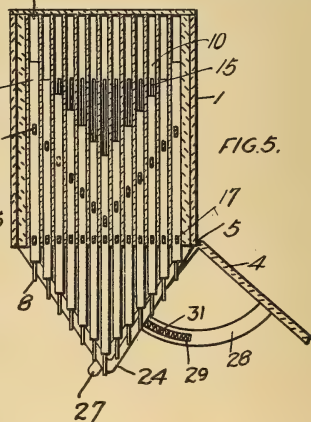


FIG. 5.

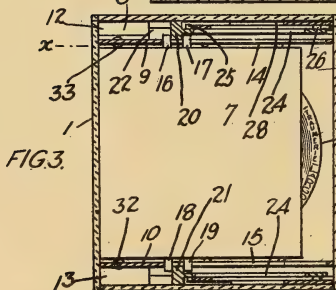


FIG. 3.

INVENTOR

MELVILLE, G. NELLES.
Hesterbury & Co
Atty.

UNITED STATES PATENT OFFICE.

MELVILLE GRANT NELLES, OF TORONTO, ONTARIO, CANADA.

PHONOGRAPHIC-DISK-RECORD HOLDER.

1,235,362.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed February 21, 1916. Serial No. 79,626.

To all whom it may concern:

Be it known that I, MELVILLE GRANT NELLES, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Phonographic-Disk-Record Holders, of which the following is the specification.

My invention relates to improvements in phonographic disk record holders and the object of the invention is to devise a simple means whereby the title of the piece inscribed on each disk will be simultaneously in an exposed position so that the eye of the observer can readily pick out one disk from the others and it consists essentially of the following arrangement and construction of parts as hereinafter more particularly described.

Figure 1, is a sectional plan view showing my cabinet holder in the closed position showing the operating parts in full.

Fig. 2, is a similar view to Fig. 1 showing the cabinet in the open position.

Fig. 3, is a longitudinal section through Fig. 1.

Fig. 4, is a plan section on line $x-y$ Fig. 3.

Fig. 5, is a similar view to Fig. 4 showing the parts in the open position corresponding to the position shown in Fig. 2.

In the drawings like letters of reference indicate corresponding parts in each figure.

1 indicates the outer casing of the cabinet provided with side horizontal guideways 2 and 3. 4 indicates the door of the cabinet hinged at 5. 6 indicates a series of compartments or stalls dividing the interior of the cabinet into vertical spaces. 7 indicates a series of disk holding pockets. 8 indicates the record disks contained in the pockets 7. Each pocket 7 is slidably held within a compartment or stall 6. 9 and 10 indicate horizontal partitions located in proximity to the top and bottom of the cabinet casing so as to form the upper and lower spaces 12 and 13. The partitions forming the sides of the compartments 6 extend between the partitions 9 and 10 and are secured thereto. 14 and 15 indicate longitudinal slots formed in the partitions 9 and 10 directly over the center of each stall formed by the partitions 6. Each pocket 7 is provided with a pair of upwardly extending lugs 16 and 17 and downwardly extending lugs 18 and 19. The

lugs 16 extend upwardly through the slots 14 and are normally in a line one with the other extending crosswise of the cabinet as indicated particularly in Fig. 4 of the drawings. The lugs 17 extend upwardly through the slots 14 and are normally disposed in V-shaped form as also indicated in Fig. 4 of the drawings. The lugs 18 and 19 extend through the slots 15, the lugs 18 being arranged similarly to the lugs 16 and the lugs 19 to the lugs 17.

20 and 21 indicate cross bars having enlarged ends 22 provided with bearing rollers 23 operating in the guideways 2 and 3.

It will, of course, be understood that there are a pair of guideways 2 and 3 located above the partition 9 and a pair of guideways corresponding thereto located below the partition 10.

24 indicates a triangular arm extending outwardly from each of the bars 20 and 21. 25 indicates a friction roller mounted on a vertical axis extending from the bar 20. 26 indicates a similar roller extending upwardly from the apex of the triangular arm 24. 27 indicates a swinging arm swingably mounted on the hinged center of the door 4 and designed to be brought alternately into contact with the rollers 25 and 26. 28 indicates arc-shaped arms carried by the door 4, the arms 28 being concentric to the center of the door hinge 5. 29 indicates a slot formed in the arm 28. 30 indicates a pin extending upwardly from the arm 27 through the slot and 31 indicates a compression spring extending between the pin or projection 30 and the end of the slot.

It will be understood that the mechanism comprising the bar 20, arm 24, arm 27 and curved arm 28 is located both above and below the partitions 9 and 10 so as to operate simultaneously upon the upper and lower ends of the pockets 7. If desired, the pocket 7 may be mounted on rollers 32 and 33 carried by the partitions 9 and 10.

Having described the principal parts involved in my invention I will briefly describe the operation of the same.

Normally the pockets are in a line when the door of the cabinet is closed. When the cabinet is opened the arms 28 are carried outwardly with the door until the end of the slot 29 engages with the pin 30. The arm 27 is then swung on its center at 5 being carried outwardly with the arm 28 until such arm 27 engages the roller 26. By con-

tinued movement of the arm 27 the cross bars 20 and 21 are carried outwardly successively engaging the projections 17 thereby sliding the pockets 7 forwardly into the position shown in Figs. 2 and 5, such position being of general V-shaped formation. When in this position the outer peripheral portion of the records protruding through the open end of the pocket are arranged in stepped relation one to the other so that the names of the pieces which are inscribed on the peripheral edge portion of the record are simultaneously visible thereby enabling any desired record to be picked out from the rest. In closing the cabinet the door is swung carrying the arm 27 into engagement with the roller 25 above and below the pockets. As the arm 27 is swung inwardly the bars 20 and 21 are carried rearwardly engaging the stops 16 so as to carry them into the normal alined position shown in Figs. 1 and 4. When they have assumed this position the doors finally close by compressing the spring 31 within the slot.

It will be understood that in all other cabinets which have been used the only arrangement which has been made for picking out one disk from another is by numbering the stalls and having an index book in which the names of the pieces are entered thus when it is desired to pick out a piece the book must first be referred to before the piece can be found. Very often the disks are placed in wrong stalls and cannot be found by referring to the book. It will then be necessary to make a search through all the disk records to find the one wanted.

In my device the names of all the disk records are held so as to be simultaneously clearly visible to the observer and all that it is necessary to do is for him to glance over the names to find the disk record which he requires without referring to any book and thereby obviating the danger of the records being mixed up and not being found by being placed in wrong stalls.

What I claim as my invention is.

1. In a phonographic disk record cabinet, the combination with the casing having

a series of vertical partitions forming stalls and a door for the cabinet, of means operated by the opening of the door for simultaneously withdrawing the disks outwardly from the stalls into a relatively rearwardly stepped position one to the other.

2. In a phonographic disk record cabinet, the combination with the casing thereof, of a series of record disk holding pockets, from which the front peripheral portion of the disk is designed to protrude, and means for drawing the disk holding pockets simultaneously outwardly and for simultaneously drawing the pockets from an alined position into a V-shaped position one to the other so that the protruding portions of the disk assume a rearwardly stepped relation one to the other.

3. In a phonographic disk record cabinet, the combination with the casing thereof, of a series of disk holding pockets held in the casing, projections extending from each pocket normally in a line extending crosswise of the cabinet and a series of projections extending from each pocket normally in V-shaped form, a cross bar extending across the pockets between each set of projections, and means for drawing the cross bar successively into engagement with the projections arranged in V-form so as to draw the pockets successively outwardly.

4. In a phonographic disk record cabinet, the combination with the casing thereof, of a series of disk holding pockets held in the casing, projections extending from each pocket normally in a line extending crosswise of the cabinet and a series of projections extending from each pocket normally in V-shaped form, a cross bar extending across the pockets between each set of projections and adapted to engage said projections, and a swingable arm operated by the opening of the door designed to carry the cross bar forwardly as the door is opened and rearwardly as the door is closed.

MELVILLE GRANT NELLES.

Witnesses:

V. LONG,
M. EGAN.

RECORD CABINET.

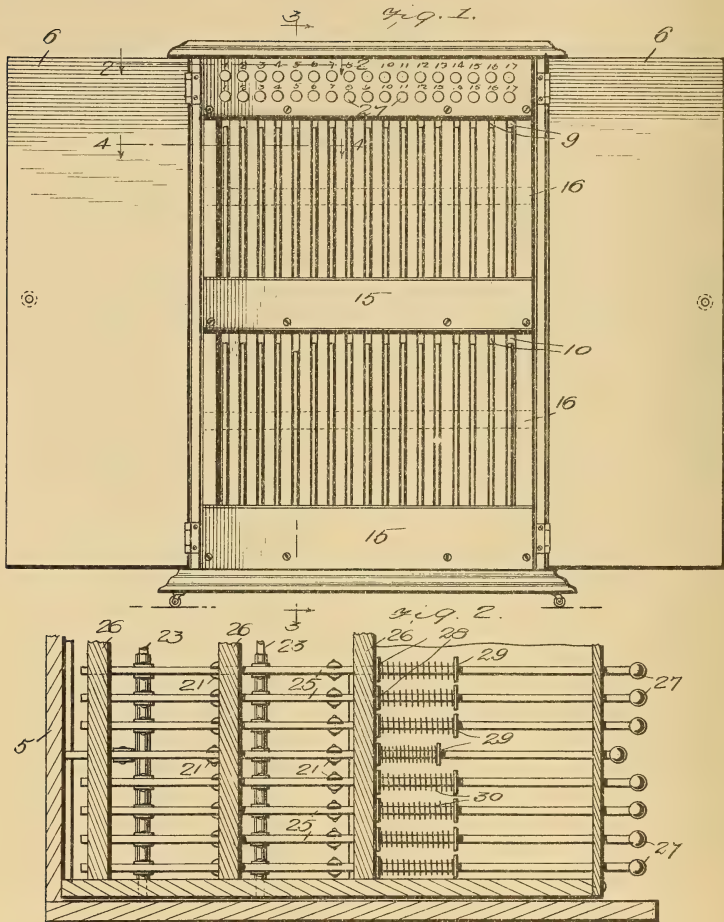
#1,235,380-----J. L. Reese,
Patented-July 31st, 1917.
Filed-June 8th, 1916 /

J. L. REESE.
 RECORD CABINET.
 APPLICATION FILED JUNE 8, 1916.

1,235,380.

Patented July 31, 1917.

2 SHEETS—SHEET 1.



WITNESSES

F. C. Barry
 H. E. Beck

INVENTOR

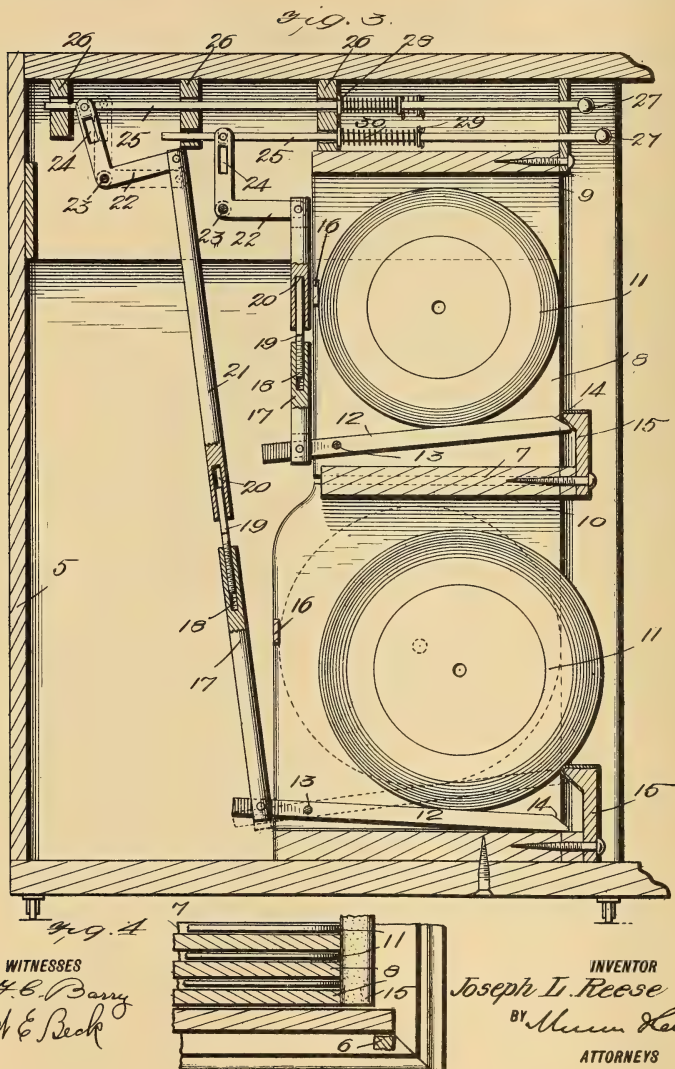
Joseph L. Reese

BY *Munroe Lee*
 ATTORNEYS

J. L. REESE.
 RECORD CABINET.
 APPLICATION FILED JUNE 8, 1916.

1,235,380.

Patented July 31, 1917.
 2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

JOSEPH L. REESE, OF HAZLETON, PENNSYLVANIA.

RECORD-CABINET.

1,235,380.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed June 8, 1916. Serial No. 102,527.

To all whom it may concern:

Be it known that I, JOSEPH L. REESE, a citizen of the United States, and a resident of Hazleton, in the county of Luzerne and State of Pennsylvania, have invented a certain new and useful Improvement in Record-Cabinets, of which the following is a specification.

This invention is an improvement in cabinets, and has particular reference to a container for graphophone records.

An object of the invention is to provide a cabinet with a plurality of record compartments from which the records are removed by novel delivery mechanism consisting of a record supporting member for each compartment normally in a position to retain the record therein and when released to permit the same to be adjusted, by the weight of the record thereon, to a position wherein a portion of the record will project from the compartment so that the same may be readily grasped and removed therefrom.

Another object of the invention is to provide a cabinet of this character which is simple in construction, easy to manufacture, and effective in carrying out the purpose for which it is designed.

The inventive idea involved is capable of receiving a variety of mechanical expressions, one of which for the purpose of illustrating the invention, is shown in the accompanying drawings, wherein—

Figure 1 is a front elevation of the cabinet constructed in accordance with the invention.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 1.

The accompanying drawings show what is now believed to be the preferred form of the invention, wherein the cabinet comprises a casing 5 having the door closures 6. Arranged in the front of the casing, and intermediate the top and bottom thereof, is a horizontally arranged partition 7, associated with which are a number of vertical partitions 8, for dividing the casing into upper and lower record compartments 9 and 10 respectively, for receiving small and large records 11.

The invention contemplates the provision of means for supporting and retaining each record entirely within its respective compartment, and to this end there is mounted in each compartment a record supporting member 12 in the form of a lever pivoted adjacent its rear end at 13, and having its forward end beveled as indicated at 14 to contact with the beveled surface of a stop 15, which is preferably cushioned. One of these stops 15 is provided for each row of compartments 9 and 10, said stops being secured to the bottom of the casing and to the horizontal partition 7, and the upper edges are so arranged that the same will be contacted by a record when the same is in the position shown at the lower end of Fig. 3, thus preventing said record from falling out of its said compartment. Suitable stops 16 are also arranged at the rear of the compartment and assist in retaining the record in position therein.

Each supporting member 12 is normally maintained in an upwardly and forwardly inclined position as shown in the upper portion of Fig. 3, and is adapted to be released, so that the same will assume the full line position shown at the lower portion of the same figure, whereupon the record supported thereon will roll forwardly into contact with the stop 15, whereupon the same will be in a position to be extracted from the cabinet.

A mechanism is employed in connection with each supporting member 12, all of the mechanisms being identical in construction, and therefore a description of one will suffice. The rear end of each supporting member 12 is connected to one end of the lower rod connection 17, the upper end of which is supplied with a threaded opening 18 to receive therein the threaded portion of an adjustable guide pin 19, the free end of which extends into and is movable in an opening 20 formed in the lower end of the upper rod connection 21. From this construction it will be apparent that there is a relative movement between the connections 17 and 20 and the distance between the adjacent ends thereof may be varied by adjusting the pin 19 should it be found necessary to make an adjustment of the parts. The upper end of the connection 21 is secured to one end of a bell crank lever 22 mounted upon a rock shaft 23. The other arm of the bell

crank lever 22 has a portion struck therefrom as indicated at 24 and bent upon the main portion of said arm to provide a pivot ear which coöperates with the said main portion to receive therebetween the push rod 25, which is adapted to operate said bell crank lever.

A number of bearings 26 are preferably secured in the top of the casing 5, and slidable in these bearings are the several push rods 25 which project through the front of the casing and are provided upon their forward ends with knobs 27. Each rod 25 is provided intermediate its ends with a collar 28 which abuts against the adjacent bearing and is loosely mounted on the rod and a second collar 29 fixed to the rod and spaced a distance from the first collar and having interposed between the same a coiled spring 30 which normally maintains the push rod in a forwardly extending position.

Assuming that it is desired to extract the lower record, as shown in Fig. 3, from its compartment, it will be apparent that, by pushing against the upper rod 25, the bell crank lever 22 to which said rod is connected will be rocked about its pivot and thus pull upwardly on the connection 21 which is normally maintaining the connection 17 in its lowest position against the weight of the record resting upon the supporting member 12. Therefore, as the connection 21 is being drawn upwardly, the connection 17 moves likewise due to the weight of the record on the supporting member 12 causing the same to move from the dotted line position shown in Fig. 3 to the full line position, whereupon said member is inclined forwardly and downwardly and the record will roll along its inclined supporting surface to the full line position shown in said figure. When in this position, a portion of the record projects beyond the front of its compartment, and the operator may grasp said portion of the record and extract the same from the casing. Immediately upon the removal of the weight of the record from its supporting member, the spring 30 will return the parts to their normal position and ready for the next operation.

It will be noted that, when the rod 25 is pushed inwardly, the connections 17 and 21 will move together until the forward end of the supporting member 12 strikes the bottom of the casing or the partition 7 which ever the case may be, after which the connection 21 has a slight movement relative to said connection 17, such relative movement being made possible by the construction of the guide pin 19 projecting into the opening 20.

What is claimed is:—

1. A cabinet having a compartment, a record supporting member in said compartment, means normally inclining the support-

ing member in one direction against the weight of a record to retain the record in the compartment, and means for releasing said member whereby the same is inclined in the opposite direction under the weight of the record thereon, to deliver the record from the compartment.

2. A cabinet having a compartment, a record supporting member in said compartment, means normally inclining the supporting member in one direction against the weight of a record to retain the record in the compartment, and means pivotally connected to said member for releasing the same whereby it may be inclined in the opposite direction under the weight of the record, to deliver the record from the compartment.

3. A cabinet having a compartment, a record supporting member in said compartment, means normally inclining the supporting member in one direction against the weight of a record to retain the record in the compartment, means for releasing said member whereby the same is inclined in the opposite direction by the weight of the record thereon whereby to deliver the record from said compartment, first said means operating to return all of the parts to normal position after the weight of the record has been removed from said member.

4. A cabinet having a compartment, a movable record supporting member therein, spring controlled retaining means for retaining said member in position against the weight of a record to support the record within said compartment, and means for releasing said retaining means whereby to permit said member to be adjusted under the weight of the record into position to deliver the latter from said compartment.

5. A cabinet having a compartment, a movable record supporting member therein, an operating element for said supporting member and adapted to be operated to release the same whereby to effect a delivery of the record from the compartment, connections between said operating element and said supporting member and operated by the former to release the latter to permit said record to be delivered, a resilient means mounted on said operating element normally retaining the supporting member against the weight of the record and operating to return the parts to normal position after the weight of the record has been removed from its supporting member.

6. A cabinet comprising a casing having a compartment, a record supporting member in said compartment and normally inclined in one direction to retain a record therein, a rod also mounted in the casing, a bell crank lever connected to said rod, adjustable connections between said bell crank lever and one end of said supporting member for maintaining the latter in position to

retain a record within the compartment, said supporting member being inclined in the opposite direction by the weight of the record thereon, when said rod is operated, whereby the record will be delivered from its compartment, and a spring associated with said rod for returning the parts to

normal position after the weight of the record has been removed from said member.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

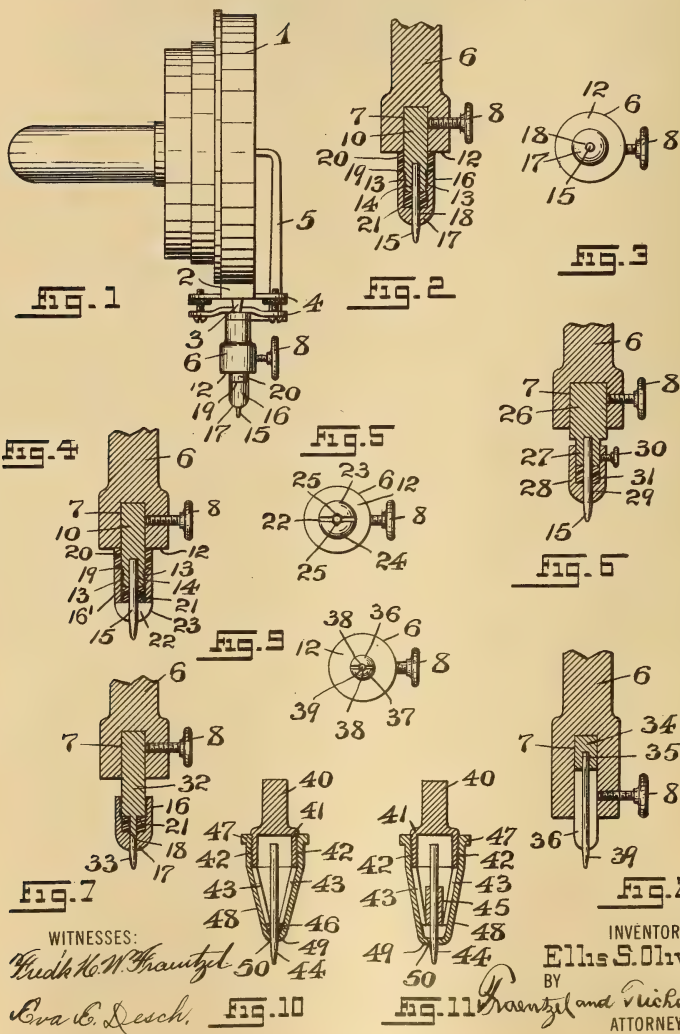
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STYLUS ADAPTER,
#1,235,591-----E.S.Oliver,
Patented-August 7th, 1917.
Filed-April 15th, 1916.

E. S. OLIVER,
 STYLUS ADAPTER,
 APPLICATION FILED APR. 15, 1916.

1,235,591.

Patented Aug. 7, 1917.



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UNITED STATES PATENT OFFICE.

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STYLUS-ADAPTER.

1,235,591.

Specification of Letters Patent.

Patented Aug. 7, 1917.

Application filed April 15, 1916. Serial No. 91,313.

To all whom it may concern:

Be it known that I, ELLIS S. OLIVER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Stylus-Adapters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates, generally, to improvements in phonograph apparatus; and the present invention has reference, more particularly, to a stylus-adapter or holder, and a needle or stylus therefor, both of a novel construction, with a view, primarily, of providing a device for permitting the needle or stylus to be used a great many times upon the same disk-record, without destroying the record-producing face of the disk or plate.

My present invention has for its principal object to provide a novel and simply-constructed stylus-adapter or holder and needle therefor of the general character hereinafter set forth and for the purpose above stated.

The invention has for its further object to provide a novel stylus-adapter with which the needle or stylus is capable of easy adjustment, so that the same needle or stylus may be used for varying the tone produced by the sound box of the phonograph.

A further object of the present invention is to produce a novel and simple stylus-adapter, in which the stylus or needle is held in such a manner and is of such construction, that the accompanying "rattle" and scratching sound, when playing a record are reduced to a minimum, so as not to be perceptible.

Other objects of the present invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the present invention.

The stylus-adapter and stylus or needle of the present invention are more especially adapted for use with that type of sound-record impressions or grooves consisting of a series of lateral or horizontal indentations or impressions formed in the face of the sound-disk or record.

With the various objects of the present invention in view, the said invention consists, primarily, in the novel stylus-adapter, and stylus or needle therefor, hereinafter more fully set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of the several devices and parts, as well as in the details of the construction of the same, all of which will be more fully described in the following specification and then finally embodied in the clauses of the claim which are appended to and which form an essential part of the said specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is an edge view of a sound box, the vibrator-arm of which is equipped with a novel stylus-adapter or holder, and a stylus of needle therefor, the same representing one embodiment of the principles of the present invention, said stylus-adapter or holder and the stylus or needle being shown in elevation.

Fig. 2 is a vertical sectional representation of a socket-member or element shown in said Fig. 1, and the novel stylus-adapter and stylus or needle, the adapter being represented in vertical section and the stylus or needle being shown in elevation; and Fig. 3 is an end view of the same, said Figs. 2 and 3 being made on an enlarged scale.

Fig. 4 is a vertical sectional representation of a socket-member or element and a stylus-adapter, and a stylus or needle therefor, said needle being shown in elevation, and the said view illustrating a modification of the principles of the present invention; and Fig. 5 is an end view of the same.

Figs. 6, 7 and 8 are views similar to Figs.

2 and 4, said views showing other modifications, but all embodying the principles of the present invention; and Fig. 9 is an end view of the construction represented in said Fig. 8.

Figs. 10 and 11 are vertical sectional representations of stylus-adapters and elevations of needles for the same, said views illustrating other modifications of the principles of the present invention.

Similar characters of reference are employed in the said above described views, to indicate corresponding parts.

Referring now to the said drawings, the reference-character 1 indicates the usual sound-box of a phonograph, or the like, with the lower portion 2 of which are suitably connected the usual fulcrum points or projections 3 upon which is fulcrumed the pivot-frame 4 of an upwardly extending vibrator-arm 5, the upper end-portion of which is connected with the diaphragm of the sound-box in the usual and well known manner.

Suitably connected with and extending downwardly from the said pivot-frame 4 is an arm or post-like element, as 6, which is formed in its lower end-portion with a receiving socket, as 7, and is also provided with a binding or tightening screw, as 8, the said socketed portion being for the purpose of receiving the stylus adapter, and the set-screw serving to secure the latter in its operative position and relation to the said arm or post-like element 6, substantially as illustrated in Figs. 1, 2, 4, 6, 7, and 8 of the drawings.

The stylus-adapter consists, essentially, of a main body 10 adapted to be inserted in the receiving socket 7 of the above-mentioned arm or post-like element 6, being secured in the said receiving socket 7 by means of the said binding or tightening screw 8. That portion of the said main body 10 which extends beyond the end-surface 12 of the said arm or post-like element 6 is externally screw-threaded, as at 13, and is made with a pin or stylus-receiving socket 14, in which is inserted a pin or stylus 15, of any suitable material and of the general configuration shown in the accompanying drawings.

Screwed upon the screw-threaded portion 13 of the said main body 10 is a hollow cap or nipple, as 16, see Figs. 1, 2 and 3 of the drawings, said cap or nipple being provided in its closed end-portion 17 with a hole or perforation, as 18, from which the free end-portion of the needle or stylus 15 projects for operative engagement with sound-disk or record. As shown in Fig. 2 of the drawings, there may be mounted upon a portion of the said main body 10, above the marginal edge 19 of the said adjustably disposed cap

or nipple, a collar as 20, made of a suitable flexible material or fabric, made of rubber or any other analogous material or fabric, as felt or the like, and mounted upon the said needle or stylus 15, and disposed within the interior of the said cap or nipple 16 there may be another collar, as 21, also made of a suitable flexible material or fabric, made of rubber or any other analogous material or fabric or the like.

In lieu of the style of cap or nipple 16 hereinabove described, a cap or nipple 16' of the form shown in Figs. 4 and 5 may be used, in which case the lower end-portion of the cap or nipple is made with a cross-cut or slit, as 22, to provide two spring-like clamping members, as 23 and 24, which may be made with oppositely disposed grooves or channels, as 25, all arranged for embracing the needle or stylus, as shown in Fig. 5, and for properly securing the said needle or stylus in its operative position, as will be clearly evident. In all other respects, the arrangement of the remaining parts of the complete stylus-adapter is the same as that described in the above and illustrated in said Figs. 1 and 2 of the drawings.

If desired, the stylus-adapter may comprise a main body, as 26, shown in Fig. 6 of the drawings, in which case the screw-thread 13 is disposed with, the said body being formed with a smooth shank-like member, as 27, upon which the hollow cap or nipple 28, provided with a hole or perforation 29 in its closed end, is slipped and may be secured in its adjusted position by a set-screw 30. Within the hollow cap or nipple 28 is a flexible collar 31, as in the constructions illustrated in Figs. 2 and 4 of the drawings, the other flexible collar 20 hereinabove mentioned being desirably omitted in this construction of stylus-adapter.

In Fig. 7 of the drawings, I have shown a stylus-adapter comprising a main body 32 with which is integrally connected, at the one end thereof, a stylus or needle-like element, as 33, the remaining parts of the stylus-adapter being made in the manner of the construction represented in Fig. 2 of the drawings.

In this construction, I have also dispensed with the use of the flexible collar 20, although such collar 20 may be employed therewith if desired.

It will be clearly evident from the foregoing description, and from an inspection of the said several figures of the drawings, that by the adjustable arrangement of hollow cap or nipple, the same stylus or needle can be employed for changing or producing tones or sounds of different intensities, and furthermore, the stylus or needle being always retained in the same fixed position with re-

lation to the main body of the stylus-adaptor, there will be no undue and irregular wearing away of the contact end of the stylus or needle, or of the sound-producing surface of the record or disk, thus enabling the use of the same stylus or needle many times.

The use of the flexible collar or collars is also of great advantage, such collar or collars preventing undue vibration, and thereby overcoming the annoying scratching sound or rattle so often accompanying the reproduction of the sound-record.

In Fig. 8 of the drawings, I have represented another form of stylus-adaptor made according to and embodying the principles of the present invention.

In this construction, the reference-character 34 indicates the main body of the needle-holder, the same being formed with a receiving socket 35, and a pair of downwardly extending clamping fingers, as 36 and 37, which are formed with oppositely placed grooves or channels, as 38, see Fig. 9 of the drawings, in which the needle or stylus 39 is placed, and suitably held or clamped between the said spring-like fingers 36 and 37. The stylus-adaptor is inserted in the socketed portion of the post-like element or arm 6, and secured in place by means of the binding or tightening screw 8, substantially as illustrated in said Figs. 8 and 9 of the drawings. Other modified constructions of the stylus-adaptor are illustrated in Figs. 10 and 11 of the drawings.

In these forms of adaptors the reference-character 40 indicates the main body of the same, being made in the form of a shank adapted to be inserted and secured in the socketed portion of the arm or post-like element 6 hereinabove mentioned. Connected with the said main body 40 is an enlarged portion or member 41 which is hollow as shown, and is exteriorly screw-threaded, as at 42. Extending downwardly from the said member 41 are a number of clamping fingers, as 43, the said fingers tapering inwardly with relation to the said device, so as to embrace and engage the stylus or needle 44, in the manner illustrated in Fig. 10, or to embrace and engage a vibration-reducing ring or sleeve, as 45, which is mounted upon the stylus or needle, as shown in Fig. 11. In the form illustrated in said Fig. 10, a vibration-reducing sleeve 46 is mounted upon the stylus or needle 44 directly beneath the needle-engaging ends of the fingers 43. Secured upon the screw-threaded part 42 of the enlarged portion or member 41 is a tightening cap or nipple, as 47, having a tapering portion 48 and a closed end 49 provided with a hole or perforation, as 50, into and through which the record-engaging end-portion of the stylus

or needle projects and extends from the said end 49 of the tightening cap or nipple 47, as illustrated in said Figs. 10 and 11 of the drawings.

The screwing up of the said cap or nipple 47, brings the tapering portion 48 in binding engagement with the clamping fingers 43, thereby causing the lower ends of the said fingers to firmly clamp or grip the stylus or needle so as to hold the same positively in its operative position, in the manner indicated in said Fig. 10 of the drawings; or, causing the lower ends of the said fingers to firmly clamp or grip the ring or sleeve 45, resulting also in securely retaining the stylus or needle in its operative position, as will be clearly understood from an inspection of Fig. 11 of the drawings.

The arrangement of the needle or stylus with the various adaptors hereinabove described is such that the engaging end of the needle or stylus uniformly wears away the bottom of the sound-groove or depression in the sound-disk or record, and not the sides of the said groove, without deterioration of the record, and without destroying the usefulness of the stylus or needle, so that the latter can be used over and over a great many times.

I am fully aware that changes may be made in the general arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, without departing from the scope of the present invention as set forth in the foregoing specification, and as defined in the claims which are appended to the said specification. Hence, I do not limit my present invention to the exact arrangements and combinations of the several devices as described in the said specification, nor do I confine myself to the exact details of the construction of the said parts, as illustrated in the accompanying drawings.

I claim:—

1. A stylus-adaptor for phonograph sound-boxes comprising a main body provided with an externally screw-threaded portion and a stylus extending from the end thereof, combined with a hollow nipple-like element provided with a screw-threaded portion adapted to be screwed upon the screw-threaded portion of said main body and provided in its end with an opening into and through which the stylus extends so as to project from said nipple-like element, and a vibration-reducing ring-shaped element within said nipple-like element and mounted upon said stylus.

2. A stylus-adaptor for phonograph sound-boxes comprising a main body and a stylus point extending from one end of said main body and an adaptor means carried by said

main body and adjustable relative to said stylus-point.

3. A stylus-adapter for phonograph sound-boxes comprising a main body, said main body being provided with a receiving socket, and a stylus point having a portion inserted in said receiving socket and projecting from the one end-portion of said main body and an adapter means carried by

said main body and adjustable relative to 10 said stylus-point.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 13th day of April, 1916.

ELLIS S. OLIVER.

Witnesses:

FREDK. C. FRAENTZEL,

FREDK. H. W. FRAENTZEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE,
#1,235,695-----E.R. Johnson,
Patented-August 7th, 1917.
Filed-December 13th, 1912.

1,235,695.

E. R. JOHNSON.
TALKING MACHINE.
APPLICATION FILED DEC. 13, 1912.

Patented Aug. 7, 1917.
3 SHEETS—SHEET 1.

Fig. 1.

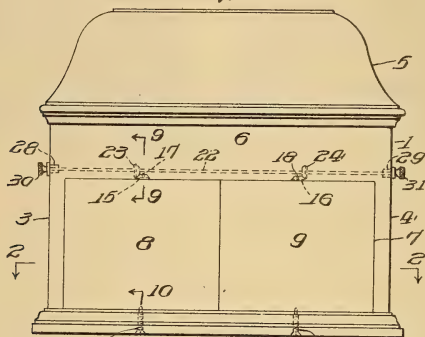


Fig. 2.



Fig. 3.

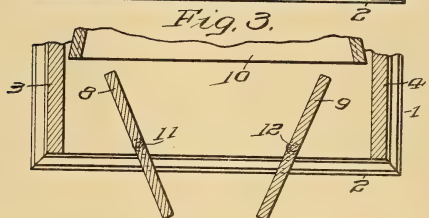
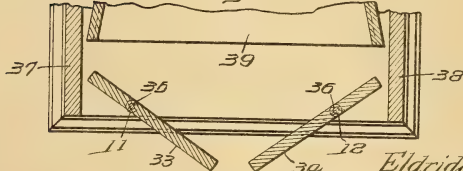


Fig. 4.



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1,235,695.

Patented Aug. 7, 1917.

3 SHEETS—SHEET 2.

Fig. 5.

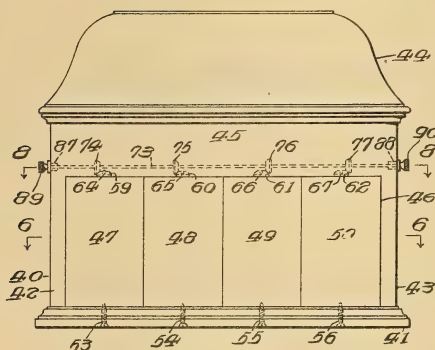


Fig. 6.

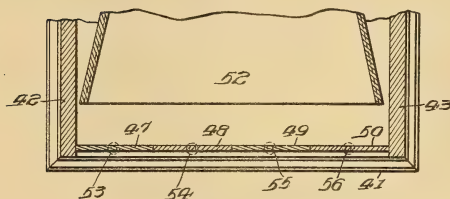
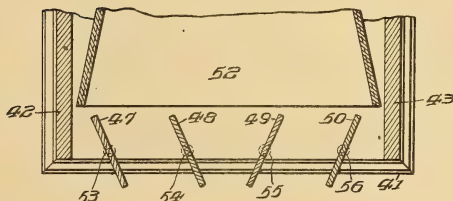


Fig. 7.



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Patented Aug. 7, 1917.

3 SHEETS—SHEET 3.

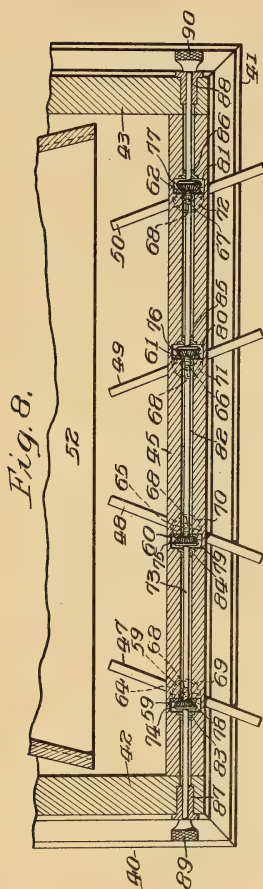


Fig. 8.

Fig. 9.

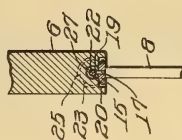
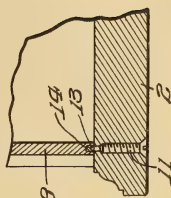


Fig. 10.

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TALKING-MACHINE.

1,235,695.

Specification of Letters Patent.

Patented Aug. 7, 1917.

Application filed December 13, 1912. Serial No. 736,475.

To all whom it may concern:

Be it known that I, ELDRIDGE R. JOHNSON, a citizen of the United States, and a resident of Merion, county of Montgomery, State of Pennsylvania, have invented certain new and useful Improvements in Talking-Machines, whereof the following is a specification, reference being had to the accompanying drawings.

This invention particularly relates to adjustable closures for varying the area of, and otherwise controlling the sound outlet aperture of a talking machine having an inclosed sound amplifier.

The principal objects of this invention are, to provide a talking machine having an inclosed amplifier, with a closure formed of pivoted doors or shutters for controlling the sound emitted from the mouth of the amplifier; and to provide means operatively connecting said doors or shutters for contemporaneously effecting their relative movement oppositely into selected relatively angular positions.

Other objects of this invention are, to provide a talking machine with doors or shutters pivoted on substantially vertical axes, and arranged to deflect the sounds emitted from the sound amplifier, laterally in substantially horizontal planes; and to provide concealed means connected to turn one or more shutters in one direction, contemporaneously with the turning of another or other shutters in an opposite direction upon their respective pivotal axes.

Further objects of this invention are, to provide a talking machine having pivoted doors or shutters, with means operatively connecting selected doors or shutters, and means to contemporaneously effect the actuation of the doors or shutters of each set or group of selected doors or shutters independently upon their respective axes of rotation.

This invention also comprehends a talking machine having doors or shutters pivoted eccentrically and connected to be contemporaneously actuated in opposite directions into different relatively angular positions.

This invention further includes all of the various novel features of construction and arrangement hereinafter more definitely specified.

In the accompanying drawings, Figure 1

is a front elevational view of a well known type of talking machine provided with doors or shutters connected to be actuated in accordance with this invention; Fig. 2 is a fragmentary plan sectional view of the front portion of said machine taken on the line 2—2 in Fig. 1; Fig. 3 is a fragmentary plan sectional view similar to Fig. 2, but showing the doors or shutters rotated on their respective axes to their partially open position; Fig. 4 is a fragmentary plan sectional view similar to Fig. 3, showing a slightly modified arrangement of the pivoted doors or shutters; Fig. 5 is a front elevational view of a talking machine provided with a convenient embodiment of a modification of this invention; Fig. 6 is a fragmentary plan sectional view of the front portion of the machine shown in Fig. 5, taken on the line 6—6 in said figure; Fig. 7 is a fragmentary plan sectional view similar to Fig. 6, but showing the shutters rotated on their respective axes to their partially open position; Fig. 8 is an enlarged fragmentary plan sectional view, showing the means for operatively connecting the shutters, taken on the line 8—8 in Fig. 5, but showing the shutters rotated to an open position; Fig. 9 is a fragmentary transverse vertical sectional view taken through the upper shutter bearing on the line 9—9 in Fig. 1; Fig. 10 is a fragmentary sectional view taken through the lower shutter bearing, on the line 10—10 in Fig. 1; and Fig. 11 is a diagrammatic or skeletonized plan view, partly in section, showing the means for independently actuating selected groups of shutters.

In said figures, the talking machine selected for illustration comprises a cabinet 1, having the base 2, side walls 3 and 4, lid 5, and front wall 6, the latter being provided with the sound outlet orifice 7, having snugly fitted therein the pivoted doors or shutters 8 and 9 forming a closure therefor and arranged to be rotated on their respective pivotal axes, as hereinafter described, to control the sound emitted from the amplifier 10 within the casing, as shown in Fig. 3.

The shutters 8 and 9 are respectively supported for rotation upon the adjustable bearing screws 11 and 12, which, as shown in Fig. 10, may be inserted through a base 2 of the cabinet 1, in threaded engagement

therewith and provided with the conical trunnions 13 fitted into similar recesses in the bearing thimbles 14, which are respectively disposed centrally in the bottom edge of the shutters 8 and 9.

The doors or shutters 8 and 9 are respectively provided with bevel or miter gears 15 and 16, which are secured to their respective trunnions 17 and 18, which project upwardly through said gears into suitable bearing bushings 19 conveniently mounted in the front wall 6 of the cabinet 1, as best shown in Fig. 9, said wall 6 being provided with suitable recesses 20 to receive the gears 15 and 16, which are invisibly disposed therein, as shown in said figure.

The shutters 8 and 9 are connected to be contemporaneously rotated about their axes, by the shaft 22, which carries the bevel or miter gears 23 and 24, which are respectively disposed in suitable recesses 25 provided therefor in the front wall 6, and which are in toothed engagement with the bevel or miter gears 15 and 16 on said shutters. The shaft 22 extends horizontally through a suitable shaft aperture 27 in the front wall 6 of the cabinet 1, and is conveniently supported in bearings 28 and 29 therein. Said shaft has its projecting extremities provided with suitable knurled knobs or thumb-wheels 30 and 31, secured thereto for conveniently rotating said shaft and thereby contemporaneously actuating said doors or shutters in relatively opposite directions of rotation.

In the form of this invention shown in Fig. 4, the doors or shutters 33 and 34 have their pivotal supports 35 and 36 eccentrically disposed, being preferably nearest to the edge adjacent to the side walls 37 and 38 of the cabinet. In this form, it will be observed, the mouth of the amplifier 39 may extend in closer proximity to the sound outlet orifice of the cabinet than in the form of the invention shown in Figs. 1 to 3, inclusive.

The form of this invention shown in Figs. 5 to 8, inclusive, comprises the cabinet 40 having the base 41, side walls 42 and 43, lid 44, and front wall 45, which latter is provided with the sound outlet aperture 46 having snugly fitted therein pivoted doors or shutters 47, 48, 49 and 50, forming a closure therefor and arranged to be rotated about their respective pivotal axes, as hereinafter described, to control the sound omitted from the amplifier 52 within the cabinet 40, as best shown in Figs. 6 and 7.

The doors or shutters 47, 48, 49 and 50 are respectively supported for rotation upon the adjustable bearing screws 53, 54, 55 and 56, which, like the bearing screw 11, shown in Fig. 10, may be inserted through the base 41 of the talking machine, in threaded engagement therewith, and provided with conical

bearings pivotally supporting said shutters.

The doors or shutters 47, 48, 49 and 50 are respectively provided with miter gears 59, 60, 61 and 62, which are secured to their respective trunnions 64, 65, 66 and 67, which are conveniently journaled in suitable bearing bushings 68 in the front wall 45 of the cabinet 40, similar to the bearing bushing 19 shown in Fig. 9, said wall 45 having its lower edge provided with recesses 69, 70, 71 and 72 to receive the respective gears 59, 60, 61 and 62, as shown in Fig. 8.

The shutters 47, 48, 49 and 50 are connected to be contemporaneously rotated upon their axes by the rotation of the shaft 73, which carries the miter gears 74, 75, 76 and 77, which are respectively disposed in recesses 78, 79, 80 and 81, provided therefor in the front wall 45, and which are in toothed engagement with the miter gears 59, 60, 61 and 62 on said shutters.

As shown in Figs. 5 and 8, the miter gears 74 and 75 are connected with the miter gears 59 and 60 at one side of their pivotal axes, while the miter gears 76 and 77 are connected with the miter gears 61 and 62 at the opposite side of their pivotal axes, so that, as will be readily seen, the doors or shutters 47 and 48 at one side of the center of the sound outlet aperture 46 will be actuated on their pivotal axes in one direction of rotation, contemporaneously with the actuation of the doors 49 and 50 upon their axes in the opposite direction of rotation.

The shaft 73 extends horizontally through a suitable shaft aperture 82 in the front wall 45 of the cabinet 40, and is conveniently supported, adjacent to the respective gears 74, 75, 76 and 77, by the bearings 83, 84, 85 and 86, as best shown in Fig. 8, and said shaft has the bearings 87 and 88 at the ends of said front wall 45, and has its projecting extremities provided with suitable knurled knobs or thumb-wheels 89 and 90 secured thereto, for conveniently rotating said shaft and thereby simultaneously actuating said shutters.

It has been found desirable to connect selected shutters, whereby the respective groups of shutters may be separately actuated, and for this purpose the shaft shown in Fig. 11 comprises the relatively rotatable sections 92 and 93, the section 92 having a reduced end projection forming a trunnion 95 extending into a central bore 96 forming a bearing in the abutted end of the section 93.

The shaft section 92 is conveniently provided with the miter gears 97 and 98 in toothed engagement with the miter gears 99 and 100 respectively on the doors or shutters 101 and 102, and said shaft section is conveniently provided with the knurled knob or thumb-wheel 104, by which said

shaft may be conveniently rotated by the operator to effect the actuation of said doors or shutters 101 and 102. The shaft section 93 is provided with the miter gears 106 and 107 in toothed engagement with the miter gears 108 and 109 respectively on the shutters 111 and 112, and is provided with the knurled knob or thumb-wheel 114 for conveniently rotating said shaft section, to effect the actuation of the shutters 111 and 112 connected therewith into any desired position independently of the shutters 101 and 102.

It will be obvious that by providing pivoted shutters mounted to rotate about vertical axes, the horizontal field of the sound emitted by the amplifier may be greatly broadened without affecting the field vertically, and that by providing means for connecting the shutters upon opposite sides of the center of the sound outlet orifice, to effect their relative movement in opposite directions contemporaneously, the sound emitted from the mouth of the amplifier will be uniformly distributed, or, in other words, symmetrically projected.

It will be equally obvious that by providing means for separately actuating selected groups of shutters rotatable about vertical axes, the horizontal field may be directed laterally, as desired; that is to say, either to the right or the left with respect to the machine, it being noted that when the shutters are positioned generally, as shown in Fig. 11, and the sound is emitted from an amplifier toward the observer, such sounds will tend to be deflected in the direction of the left hand of the observer.

Although the gearing connection between the shaft 73 and the shutters 47, 48, 49 and 50 comprises miter gears in toothed engagement, it is to be understood that such connection may be otherwise effected, for instance, by worms in cooperative engagement with worm-gears, or by suitably correlated levers, and therefore it is not desired to limit this invention to the precise details of construction and arrangement herein set forth, as various modifications may be made therein without departing from the essential features of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. In a talking machine having a sound orifice, the combination with a pair of pivoted doors or shutters fitted to rotate in said orifice, of means rotatably mounted on an axis transverse to the axes of said shutters and operatively connected with each of said shutters to effect the contemporaneous relative rotation of said shutters in respectively opposite directions.

2. In a talking machine having a sound orifice, the combination with a plurality of

pivoted doors or shutters fitted to close said orifice and mounted to rotate therein, of a shaft rotatably mounted on an axis transverse to the axes of said shutters, and means on said shaft connected with said shutters, to effect the contemporaneous relative rotation of predetermined groups of said shutters in respectively opposite directions.

3. In a talking machine having a sound orifice, the combination with a plurality of pivoted doors or shutters fitted to close said orifice when in alinement, of miter gears mounted on said shutters, an actuating shaft rotatably mounted on an axis transverse to the axes of rotation of said shutters, and miter gears on said shaft in toothed engagement with the miter gears on said shutters, the miter gears of the shutters on the opposite sides of the center of the sound orifice being respectively engaged upon the opposite sides of their axes of rotation by the miter gears on said shaft, to effect the opposite rotation of the sets of shutters.

4. In a talking machine having a sound orifice, the combination with a plurality of pivoted doors or shutters fitted within said orifice and having their respective edges abutted when disposed in alinement, of gearing correlatively engaged upon relatively different sides of their axes of rotation, to effect the contemporaneous rotation of certain selected shutters in one direction while rotating the other shutters in the opposite direction.

5. In a talking machine having a sound orifice in a wall thereof, and having recesses in said wall in communication with said orifice, the combination with a plurality of pivoted doors or shutters, bearings in said recesses for said shutters, gears on said shutters disposed in said recesses, an actuating shaft rotatively mounted in suitable bearings in said wall, gears on said shaft co-operating with the gears on said shutters and disposed in said recesses, the gears of the shutters on one side, and the gears of the shutters on the other side of the orifice being respectively engaged with the shaft gears in diametrically opposite relation, to effect the opposite rotation of the respective sets of shutters.

6. In a talking machine comprising a cabinet having a sound orifice and provided with recesses in the wall having said orifice, the combination with a plurality of pivoted doors or shutters fitted within said orifice, operative to close the same when disposed in alinement and respectively mounted to rotate about separate vertical axes, of bearings for said shutters disposed in said recesses, bevel or miter gears on said shutters disposed in said recesses, a shaft rotatively mounted in suitable bearings and extending through the wall of said cabinet adjacent to said orifice, miter gears on said shaft in

mesh with the miter gears on said shutters and disposed in said recesses, the gears on selected shutters being engaged by the shaft gears on one side of their respective axis of rotation, and the gears on the other shutters being engaged by the shaft gears on the opposite side of their respective axis of rotation, and thumb-wheels on the ends of said shaft exterior to said casing whereby said shaft and shutters may be rotated.

7. In a talking machine, the combination with a casing providing a sound orifice, of sound reproducing means communicating with said orifice, and groups of doors or shutters arranged to control the passage of sound through said orifice, said doors or shutters being mounted to oscillate about par-

allel axes, and said doors or shutters in each of said groups being operatively connected to each other so that the doors or shutters in any group will be restrained to oscillate simultaneously in the same direction, and the doors of one of said groups being arranged so as to be oscillated in a predetermined direction while the doors of another of said groups are being oscillated in an opposite direction.

In witness whereof, I have hereunto set my hand this 12th day of December, A. D. 1912.

ELDRIDGE R. JOHNSON.

Witnesses:

FRANK B. MIDDLETON, Jr.,
DONALD G. WOLFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH BRAKE,
#1,235,720-----A.A.J.M.Nielsen,
Patented-August 7th, 1917.
Filed-May 13th, 1915.

A. A. J. M. NIELSEN.
 PHONOGRAPH BRAKE.
 APPLICATION FILED MAY 13, 1915.

1,235,720.

Patented Aug. 7, 1917.

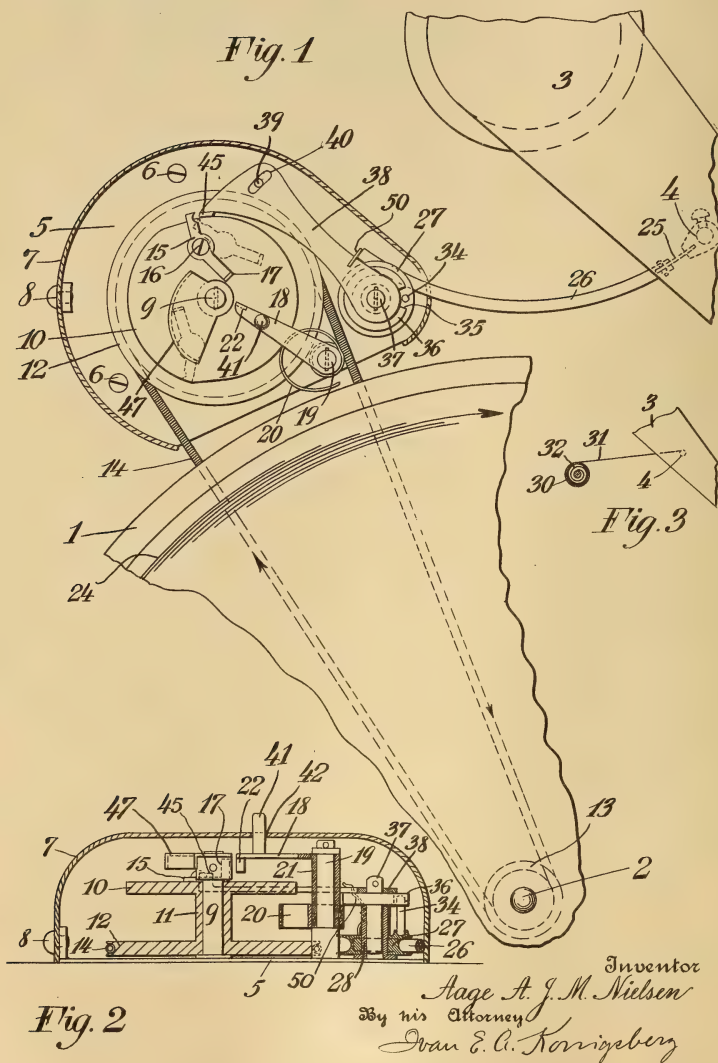


Fig. 2

Inventor

Aage A. J. M. Nielsen

By his Attorney

Ivan E. A. Korrigsberg

UNITED STATES PATENT OFFICE.

AAGE A. J. M. NIELSEN, OF NEW YORK, N. Y., ASSIGNOR TO WILLIAM A. CONDON, OF SUMMIT, NEW JERSEY.

PHONOGRAPH-BRAKE.

1,235,720.

Specification of Letters Patent.

Patented Aug. 7, 1917.

Application filed May 13, 1915. Serial No. 27,809.

To all whom it may concern:

Be it known that I, AAGE A. J. M. NIELSEN, a citizen of the Danish Monarchy, and a resident of New York city, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Phonograph-Brakes, of which the following is a specification.

This invention relates to phonograph brakes and the object of the invention is to provide a mechanically operated brake mechanism for the record turntable or like element of a talking machine so arranged and designed that it will automatically brake the turntable when the record has been played irrespective of the length of the record and without requiring any other attention from the operator than the releasing of the brake when a new record is to be played. That is this invention has for its main object to provide a brake mechanism which requires no setting or measuring or adjusting for each record. Other objects of the invention are to provide a phonograph brake of simple design, adapted to be manufactured and sold at a low price and one which may be readily attached to different makes of talking machines.

With the above and other objects in view the invention is embodied in a phonograph brake mechanism as hereinafter described and as illustrated in its preferred form in the accompanying drawings in which—

Figure 1 is a plan view of a phonograph equipped with a brake mechanism embodying the invention.

Fig. 2 is an elevation of the brake mechanism, partly in section.

Fig. 3 shows a modification.

The phonograph elements are illustrated to such an extent only as is necessary for the understanding of the invention and are represented by the turntable 1 operated in the usual manner on the turntable shaft 2. 3 is the tone arm provided with a depending pin 4 such as is found on most new machines for the purpose, generally of operating other types of turntable brakes.

The brake mechanism according to this invention is supported on a plate 5 which may be secured to the cover of the phonograph by screws 6 as shown and a casing or cover 7 may be used to cover the mechanism and which may be secured to a lug on the base by a screw 8. On a fixed pivot 9 there is

rotatably mounted a cam 10 which by means of connecting sleeve 11, rotates with a pulley 12 driven from a smaller pulley 13, which is slipped over the turntable shaft 2 under the turntable 1. A coiled spring 14 may be used to transmit the power from the pulley 13 to the pulley 12 and acts like a belt.

The cam 10 carries a brake setting or operating lever 15 mounted to turn on a pivot 16 and the lever 15 is further provided with an upwardly projecting lug 17. 18 is a brake arm pivoted on a fixed stud 19. 20 is the brake secured to the hub 21 of the brake arm, which is provided with a depending lug 22. It will be clear therefore that when the lug 17 of the brake operating lever hits the lug 22 of the brake arm, as said lever is rotated with the cam 10, the brake arm will be turned on its pivot 19 and the brake applied to the turntable 1. This, however, is only to occur when the record 24 has finished playing and means are therefore provided for preventing the lug 17 from hitting the lug 22 while the record is being played. These means take the following form.

To the aforesaid pin 4 on the tone arm 3 there is secured a spring 25 which keeps a friction member 26 in frictional contact with a friction pulley 27 loosely rotatable on a fixed sleeve 28 in the base 5. The member 26 is a friction driving element and may be a stiff wire having a rubber sleeve or roughened surface. Or the member 26 may have teeth engaging a gear instead of the friction pulley. Or again, as shown in Fig. 3, a drum 30 may be substituted for the pulley and operate a cord 31 by a spring 32, the cord 31 being secured to the pin 4, so that as the tone arm is moved inwardly over the record 24 the spring winds up the cord and turns the drum 30 in an anti-clockwise direction, and when the tone arm moves outwardly the spring is unwound.

The friction pulley 27 carries a pin 34 which plays in a slot 35 in the stud collar 36 on the stud 37 which turns loosely in the said sleeve 28. As the friction pulley is rotated by the friction member 26, the stud 37 is rotated by the pin 34 and in turn moves the oscillating lever 38 to the left in Fig. 1, said lever resting on the said collar 36. The movements of the lever 38 are regulated by the fixed pin 39 and slot 40 in said lever.

It will therefore be seen that the member 26, as it is moved to the left by the tone arm

3, constantly rotates the friction pulley in an anti-clockwise direction. And that the stud collar 36 is also rotated in the same direction because the pin 34 on the pulley extends into the slot 35 in the collar. Again, the lever 36 which merely rests upon the collar is by friction therewith constantly urged or moved toward the cam 10 and into the path of the brake operating lever 15 as shown in Fig. 1.

When the high part of the cam 10 touches the lever 38 the latter is moved back or to the right on the friction collar 36 though the latter is constantly rotated from right to left. It will therefore be seen that I have provided a very sensitive yet very practical and efficient friction drive for the lever 38, in that, the outward movement of the latter in no wise affects the constant inward movement of the tone arm, and that the latter is called upon to do no heavy work such as might influence the movements on the record disadvantageously.

The operation is as follows. When it is desired to play a record the brake is released by taking hold of a handle 41 on the arm 18 to move the brake 20 away from the turntable which thereupon commences to rotate with the record and of course the cam 10 commences to rotate by the means described above. A slot 42 in the cover 7 limits the releasing movement of the arm 18, the said handle 40 projecting through said slot.

During the inward movement of the tone arm the arm 38 is constantly being moved inward or held against the cam 10 by the frictional drive elements 26, 27, and 34 and when the lever 15 reaches the arm 38, the latter forms an obstruction which turns the lever on its pivot 16 as shown dotted, so that lug 17 will pass by lug 22 and the brake will not operate. Immediately thereafter the arm 38 is moved outwardly by the high part of the cam 10, but as soon as the high part has passed the point 43 of the arm the latter is again moved into the path of the lever 15.

After the lever 15 has been turned to pass by lug 22 it must be turned back so as to be able to hit lug 22 when the record has finished playing. To this end there is secured to the stud 9 a cam 47 which turns the lever 15 back into its original position as shown in dotted lines.

In other words, during the playing of the record, the arm 38 is oscillated to the left by the friction drive elements so as to turn brake lever 15. And the arm 38 is moved to the right by the cam 10 against the friction of the friction drive elements.

When, however, the record is played and the tone arm remains practically stationary, the arm 38 remains in its outward position caused by the cam 10 and consequently the lever 15 is not turned by the said arm. Therefore, the lug 17 will hit the lug 22, the

brake will be operated and the turntable will cease rotating.

To insure that the brake will operate at the proper time the following features of the invention should be noted.

The movement of the tone arm 3 on a phonograph is hardly ever a steady even motion toward the center of the record. This is because the records are not mathematically exact in that it hardly ever happens that the record center is concentric with the center of the turntable shaft. So that even when the tone arm is moved toward the center the width of a record groove for each revolution it swings back and forth during its movement over the record. I have observed that a tone arm may swing or oscillate as much as three thirty-seconds of an inch during one revolution of the turntable.

The outward movement of the tone arm causes a similar movement of the friction member 26 which tends to rotate the friction pulley 27 backward. The slot 35 in the stud collar 36 must therefore be so wide as to permit this backward movement of the friction pulley 27 and its pin 34 which plays in said slot and whereby it is certain that the collar 36 will be driven in one direction only so as to urge the lever 38 inward immediately after the cam 10 has passed said lever and whereby the inward movement of said lever 38 is assured so as to come into the path of lever 15.

If this were not so, the lever 38 might be in its outward position at the very moment it is relied upon to turn lever 15.

Inasmuch as it is impossible to know the exact moment during a revolution of the record when the tone arm will be in its position nearest the record center (though we do know that it must happen once during the revolution) it is necessary that the cam 10 be long enough to keep the lever 38 in its outward position for at least an entire revolution of the record to be sure that the stud collar 36 is moved inwardly during last revolution prior to the braking without also moving the lever 38 inwardly into the path of the lever 15. On the other hand, the low portion of the cam 10 should be long enough to permit the lever 38 to be moved into the path of the lever 15 once during each revolution.

It will therefore be clear that the construction illustrated and described insures sufficient elasticity and freedom of movement of the various parts to correspond with the practical operations of a phonograph and at the same time insure proper application of the brake when the record is finished.

It might also happen that at the very beginning the brake would be operated because the lever 38 was moved outward by the friction drive member 26 when the latter with the tone arm is moved outward into

starting position. This difficulty is overcome by providing a spring 50 on the member 26 which presses the lever 38 inward during the first part of the playing of the record.

To sum up, 15 is a constantly rotating brake lever which is rendered inactive by the lever 38 while the record is playing and the lever 38 is moved into operative position by the movement of the tone arm. But when the record is finished the lever 38 is no longer moved into the path of the brake lever and the latter operates the brake.

I have constructed and successfully operated a brake according to this invention. The mechanism responds promptly to the action of the phonograph and brakes the turntable within about two or at the most three revolutions after the end of the record groove has been reached.

The mechanism is inexpensive and is easily attached to the phonograph. Details in the construction may be varied to suit different makes and dimensions of phonographs, but I claim all such changes as come within the principle of the invention as defined by the appended claims.

I claim:—

1. The combination with a swinging member and a rotating member, a brake for the latter, an arm on said brake for moving the same into and out of braking position, a lever, means for operating said lever into the path of the said arm to operate the brake when said swinging member ceases to move and mechanism for moving said lever out of the path of said brake arm to prevent operation of the brake while said swinging member moves.

2. The combination with a swinging member and a rotating member, a brake for the latter, a lever for actuating the brake, means for rendering said lever inactive while the said swinging member moves, mechanism for operating the said means from the said swinging member and means operated by said rotating member for moving said lever into position to actuate the brake when the said swinging member ceases to move.

3. The combination with a swinging member and a rotating member, a brake for the latter, a member for moving the brake into and out of braking position, an element adapted to be moved into contact with the said brake member to apply the brake, means for rendering said element inactive before it contacts with said brake member to prevent operation of the brake while said swinging member moves and means for operating said element into active position to contact with said brake member when said swinging member ceases to move.

4. The combination with a swinging mem-

ber and a rotating member, a brake for the latter, a brake arm on said brake, a member adapted to be moved into contact with said brake arm to operate the brake, means operated by said swinging member for rendering said element inactive while said swinging member moves and mechanism operated by said rotating member for moving said element into active position to contact with said brake arm to apply the brake when the said swinging member ceases to move.

5. The combination with a swinging member and a rotating member, a brake for the latter, brake operating means, mechanism for rotating the latter continuously to cause it to operate the brake and means for moving said brake operating means into and out of operative position with respect to the brake during the rotation of said brake operating means.

6. The combination with a swinging member and a rotating member, a brake for the latter, a brake lever, means for rotating the latter continuously to cause it to operate the brake, movable means for rendering said lever inactive while the swinging member moves and means for moving said lever back into active position.

7. The combination with a swinging member and a rotating member, a brake for the latter, a brake lever, means for rotating the latter continuously to cause it to operate the brake, mechanism for rendering said lever inactive while the swinging member moves and means for operating said mechanism from the said swinging member.

8. The combination with a swinging member and a rotating member, a brake for the latter, a brake lever, means for rotating the latter, a brake arm on said brake projecting into the path of said brake lever, means for rendering the latter inactive with respect to the said brake arm while the said lever moves past the brake and fixed means for moving the said lever back into active position after it has moved past said brake arm.

9. The combination with a swinging member and a rotating member, a brake for the latter, a brake lever for operating the brake, means for turning said brake lever into operative position with respect to the brake while the swinging member moves, a fixed cam for turning said brake lever back into operative position with respect to the brake, a rotating cam for moving said brake lever toward the brake to operate the latter and for periodically operating the said brake lever turning means.

Signed at New York in the county of New York and State of New York this 3rd day of May A. D. 1915.

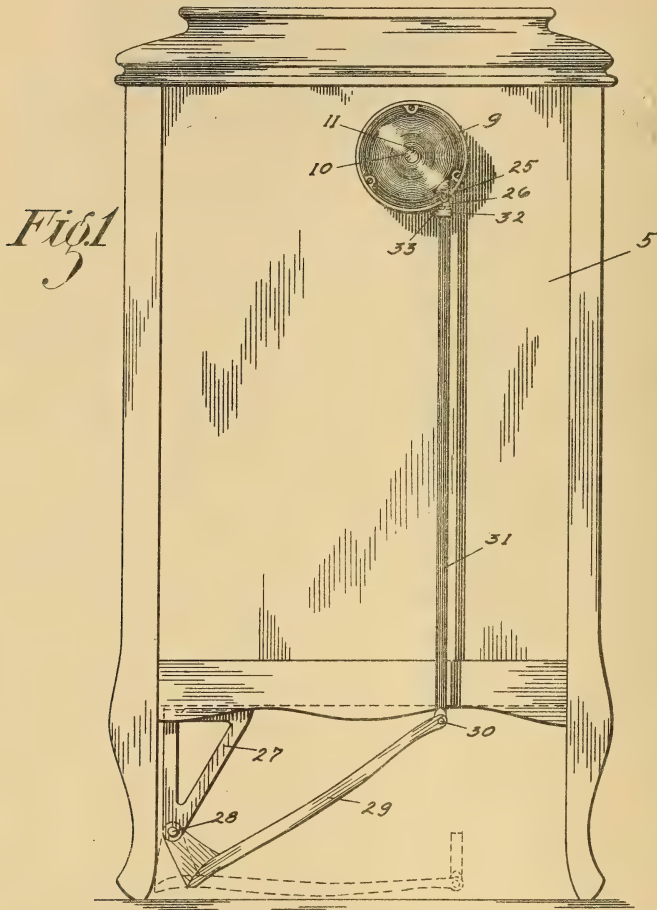
AAGE A. J. M. NIELSEN.

WINDER FOR PHONOGRAPHS,
#1,236,176-----R.S.Irvine,
Patented-Aug. 7th, 1917.
Filed-October 23rd, 1916.

1,236,176.

Patented Aug. 7, 1917.

3 SHEETS—SHEET 1.



WITNESS

Bernard F. Ford

INVENTOR.

Richard S. Irvine

BY

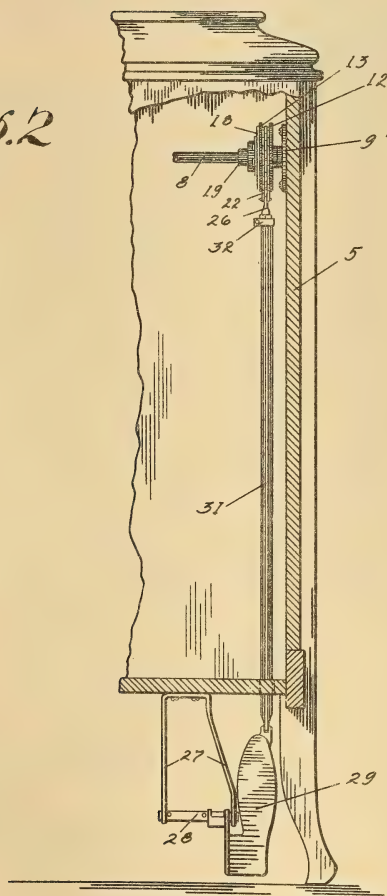
Samuel S. Webster
ATTORNEY

R. S. IRVINE.
WINDER FOR PHONOGRAPHS.
APPLICATION FILED OCT. 23, 1916.

1,236,176.

Patented Aug. 7, 1917.
3 SHEETS—SHEET 2.

Fig. 2



WITNESS

Bernard Piva

INVENTOR.

Richard S. Irvine

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WINDER FOR PHONOGRAPHS.
APPLICATION FILED OCT. 23, 1916.

Patented Aug. 7, 1917.

3 SHEETS—SHEET 3.

1,236,176.

Fig. 3

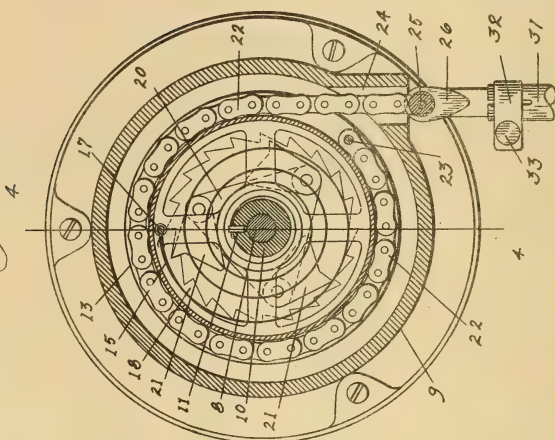
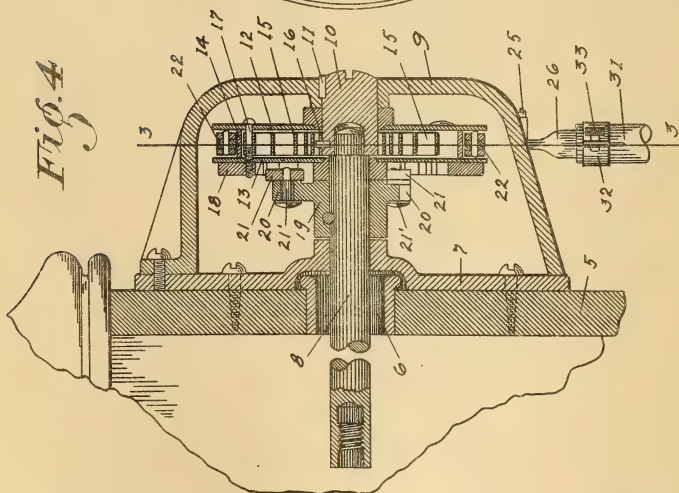


Fig. 4



WITNESS

Bernard Rivard

INVENTOR.

Richard S. Irvine

BY

Percy S. Webster
ATTORNEY

UNITED STATES PATENT OFFICE.

RICHARD S. IRVINE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO EILERS MUSIC COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION.

WINDER FOR PHONOGRAPHS.

1,236,176.

Specification of Letters Patent.

Patented Aug. 7, 1917.

Application filed October 23, 1916. Serial No. 127,242.

To all whom it may concern:

Be it known that I, RICHARD S. IRVINE, a citizen of the United States, residing at San Francisco, in the county of San Francisco, State of California, have invented certain new and useful Improvements in Winders for Phonographs; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in winders for phonographs and my improved structure is designed to supplement the hand winding cranks now commonly in use on all phonographs.

A further object of the invention is to produce a structure which can be applied both to the present already constructed phonographs as well as to those to be constructed in the future. Also the invention is designed for application to the various different types now in common use.

A still further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a front elevation of the winding device assembled on the outside of the cabinet of a phonograph.

Fig. 2 is a side elevation showing the winder installed within the cabinet of a phonograph.

Fig. 3 is a front elevation of the winding mechanism in section on line 3—3 of Fig. 4.

Fig. 4 is a side elevation on line 4—4 of Fig. 3.

Referring now more particularly to the characters of reference on the drawings, the numeral 5 indicates the cabinet of a phonograph in the wall of which is provided an opening 6 through which the ordinary winding crank rod is to be inserted. Over the opening 6 is placed a plate 7 supporting a shaft 8 formed at its inner end to fit the winding stem of the phonograph motor. Fitted to

the outside of the plate 7 is a cover casing 9. Within an opening in the casing 9 is secured a cylindrical plug 10 secured to the casing by a key 11 and orificed at its inner end to form a bearing for the end of the rod 8. Journaled on the plug 10 is a disk 12 and on the rod 8 is journaled a disk 13.

Between the disks 12 and 13 and secured to each is a cylindrical bushing 14, which, taken together, form a sheave. Between the disks 12 and 13 and within the bushing 14 is placed a flat coil spring 15 having its inner end secured to a pin 16 in the plug 10 and its outer end threaded on a screw 17 supported by the disks 12 and 13. Secured to the outside of the disk 13 is an internal ratchet plate 18. Keyed to the rod 8 is a hub provided with arms 20 on each of which is pivoted a weighted pawl 21 on pins 21' and adapted to engage the teeth of the ratchet 18.

On the rim of the bushing 14 rests a chain 22 or other suitable flexible member having one of its ends secured by the pin 23 in the disks 12 and 13. This chain extends around the bushing 14 and its other end is passed through an opening 24 in the casing 9 where it is secured by a pin 25 to a rod 26. Fitted to the under side of the cabinet 5 is a supporting frame 27 carrying at its lower end a rod 28 which pivotally supports the foot pedal 29 pivoted by the pin 30 to the lower end of the tube 31. The tube 31 telescopes over the rod 26 and is adjustably secured thereto by a clamp 32 provided with a thumb nut 33.

When the pedal 29 is depressed, the chain unwinding from the sheave rotates the ratchet 18, which, through the pawls 21, rotates the winding rod 8. When the pressure of the foot is relieved, the spring 15 rotates the sheave and rewinds the chain 22 thereon lifting the pedal 29. This operation is repeated until the motor is sufficiently wound.

Figs. 1, 3 and 4 show particularly the structure as it would be applied to the winding cranks of phonographs already constructed. If my improved winding means were to be constructed in conjunction with machines to be made in the future, it would be built directly as a part of the machine as shown in Fig. 2.

From the foregoing description it will be readily seen that I have produced such a de-

vice as substantially fulfils the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of
5 the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention as defined by the appended claims.

Having thus described my invention what
10 I claim as new and useful and desire to secure by Letters Patent is:

1. The combination with a phonograph having a winding shaft and an opening through which the winding shaft projects,
15 of a plate surrounding the opening and forming a bearing for the winding shaft, a casing attached to the plate and provided with an opening, a plug removably keyed in the opening and orificed to form a bearing
20 for the winding shaft, a foot pedal, and means disposed within the casing and connected with the winding shaft and with the pedal whereby with the motion of the pedal rotary motion may be imparted to the wind-
25 ing shaft.

2. The combination with a phonograph having a winding shaft and an opening through which the winding shaft projects,
30 of a plate surrounding the opening and forming a bearing for the winding shaft, a

casing attached to the plate and provided with an opening, a plug removably keyed in the opening and orificed to form a bearing for the winding shaft, a foot pedal, means
35 disposed within the casing and connected with the winding shaft and with the pedal whereby with the motion of the pedal rotary motion may be imparted to the winding shaft, such means comprising a sheave rota-
40 tably mounted adjacent said plug, a spring within the sheave and arranged to maintain its normal position, a chain wrapped around the sheave and connected with the foot pedal whereby the operation of the foot pedal will
45 rotate the sheave, an internal ratchet rack on the sheave, and dogs connected with the winding shaft and engaging the ratchet rack whereby with the movement of the sheave in a forwardly direction, the winding shaft
50 will be rotated in a forward direction.

3. A winding attachment for phonographs comprising an independent casing arranged to be attached to the outside of the phono-
graph casing, an independent shaft jour-
55 naled within the casing and adapted to connect with the winding stem of the phonograph, and a power means for turning the shaft.

In testimony whereof I affix my signature.

RICHARD S. IRVINE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH ATTACHMENT,
#1,236,248-----W.A. Atkinson,
Patented-Aug. 7th, 1917.
Filed-May 19th, 1916.

W. A. ATKINSON.
 PHONOGRAPH ATTACHMENT.
 APPLICATION FILED MAY 19, 1916.

1,236,248.

Patented Aug. 7, 1917.

Fig. 1.

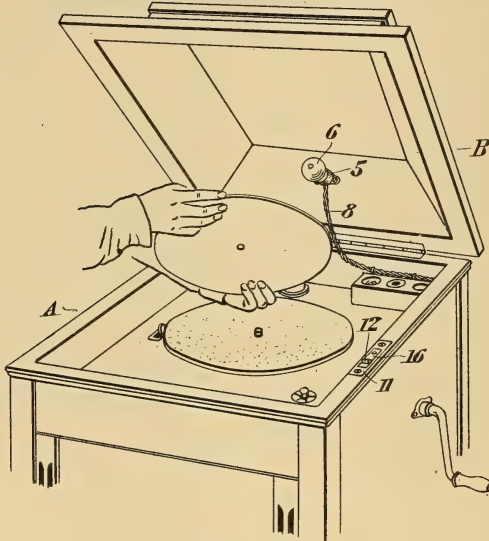


Fig. 2.

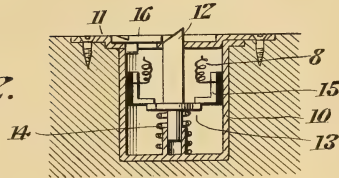
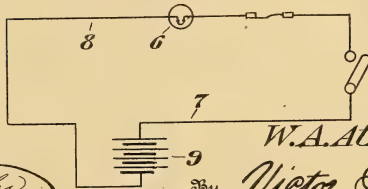


Fig. 3.



Inventor

W. A. Atkinson

By

Victor J. Evans

Attorney

Witnesses

W. H. Loper
H. J. Lander

UNITED STATES PATENT OFFICE.

WILFRED A. ATKINSON, OF PHILLIPSBURG, NEW JERSEY.

PHONOGRAPH ATTACHMENT.

1,236,248.

Specification of Letters Patent.

Patented Aug. 7, 1917.

Application filed May 19, 1916. Serial No. 98,617.

To all whom it may concern:

Be it known that I, WILFRED A. ATKINSON, a citizen of the United States, residing at Phillipsburg, in the county of Warren and State of New Jersey, have invented new and useful Improvements in Phonograph Attachments, of which the following is a specification.

The invention relates to phonograph attachments, and more particularly to the class of automatic lighting attachments for phonograph or the like cabinets.

The primary object of the invention is the provision of an attachment of this character wherein an electric light is placed within the lid of a phonograph or the like cabinet so that it will become illuminated on the raising of the lid for supplying light to permit the operator of the phonograph machine to properly place the stylus upon the record and thereby avoid scratching of said record by misplacing the stylus after the starting of the phonograph.

Another object of the invention is the provision of an attachment of this character wherein the lid automatically controls the electric light so that it can be illuminated on the raising of the lid of the cabinet of a phonograph, and when the lid is closed the electric circuit is automatically opened for extinguishing the light.

A further object of the invention is the provision of an attachment of this character wherein the electric circuit for the light is both automatically and hand controlled.

A still further object of the invention is the provision of an attachment of this character which is extremely simple in construction, thoroughly reliable and efficient in its purpose, readily and easily applied within the cabinet of a phonograph and inexpensive in manufacture and installation.

Other objects will be in part obvious and in part hereinafter set forth.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter described, and the scope of the application of which will be indicated in the appended claim.

In the accompanying drawings:

Figure 1 is a perspective view of a phonograph cabinet showing the lid raised, with the attachment constructed in accordance with the invention applied;

Fig. 2 is a fragmentary vertical sectional view through the automatic and hand controlled current switch;

Fig. 3 is a diagrammatic plan view showing the electric circuit and light.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawing in detail, A 65 designates a phonograph cabinet which is of the ordinary well known construction having the hinged lid or top B which, when raised, permits access to be had to the phonograph instrument for the playing 70 thereof, and within the body A is arranged the light attachment hereinafter fully described.

The light attachment comprises an electric bulb socket 5 which is fixed in any suitable manner interiorly of the lid or top B 75 on the inner face thereof, and within this socket is mounted the ordinary incandescent globe 6, the same being lighted by means of electrical connections including the current 80 wires 7 and 8 respectively, battery 9 and circuit closer, the wires being extended to the back of the cabinet so as to be out of the way and not interfere with the operation of the phonograph, while the battery 9 is located within the body A of the cabinet, 85 and the cut-off is arranged in one wall of said body to be automatically operated by the lid B in a manner presently described.

The cut-off comprises a hollow barrel 10 90 which is set in the wall of the body A of the cabinet so that its attaching plate 11 will be flush with the upper edge of said wall. Within the barrel 10 is a slidable plunger 12 having a bridging shoulder 13, 95 against which works a coiled expansion spring 14 surrounding the plunger 12 and supported within the barrel 10, the spring being designed to project the plunger 12 without the barrel through the plate 11 into the path of movement of the lid B when being closed.

Arranged interiorly of the barrel 10 at opposite sides thereof and insulated from the same are contacts 15 which have connected therewith branches or stretches of the current wire 8, and these contacts 15 are disposed in the path of movement of the bridging contact shoulder 13 so that when engaged therewith the electric circuit will 110 be closed to the lamp for illuminating the same. The lid B, when closed, acts upon

the plunger 12, forcing the same inwardly against the resistance of the spring 14, thus disengaging the shoulder 13 from the contacts 15 and thereby automatically opening the circuit for the extinguishing of the lamp 6 interiorly of the lid.

The plate 11 is suitably countersunk to receive a hand slide 16 which is adapted to be moved over the plunger 12 for holding the same against the resistance of the spring 14, whereby the shoulder 13 will be out of engagement with the contacts 15 and thereby opening the circuit. The plate 16 is operated by hand and in this manner the circuit can be opened and closed, as will be obvious.

It is of course understood that when the lid is in closed position the lamp 6 is extinguished. The plate 16 is flush with the upper surface of the plate 11 and slides in the countersink in the latter.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the herein described attachment will be readily apparent and, therefore, a more extended explanation has been omitted.

Having thus described my invention, I claim:

A cut out for an electric circuit comprising a hollow barrel adapted to be mounted

within the wall of an inclosure and having a plate flush with the mouth thereof, a pair of contacts arranged within the barrel and insulated therefrom and adapted to have connection with the wires of the circuit, a socket provided in the bottom of the barrel, a plunger slidably mounted within the barrel, one end of said plunger being mounted in the socket and having its opposite end slidably engaging an aperture in the above mentioned plate, a bridge piece located upon said plunger between the ends thereof for engagement with the contacts to close the circuits, a spring surrounding said plunger and interposed between the bridge piece and the bottom of the barrel to force the said plunger without the plate into the path of a movable part of the inclosure, whereby, on bringing the movable part into contact with the other edge of the inclosure the plunger will be displaced to open the circuit, said plunger being formed with a tapered end, said plate being formed with a counter seat and a slide operating in said counter seat and engaging with the beveled edge of the plunger to act thereon upon movement of the slide in one direction to receive the plunger.

In testimony whereof I affix my signature.

WILFRED A. ATKINSON.

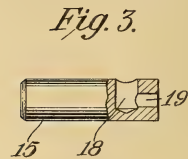
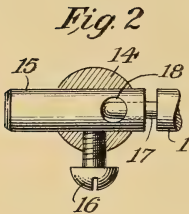
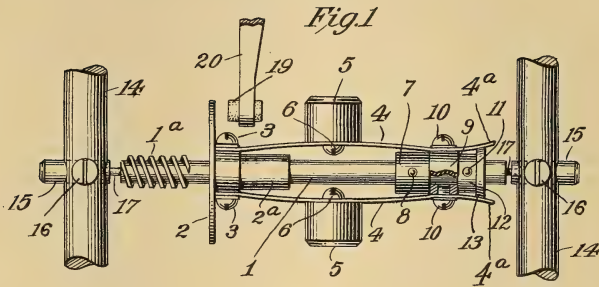
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

GOVERNOR FOR SPRING MOTORS,
#1,236,449-----T.W.Kirkman,
Patented-August 14th, 1917.
Filed-May 8th, 1917.

T. W. KIRKMAN.
GOVERNOR FOR SPRING MOTORS.
APPLICATION FILED MAY 8, 1917.

1,236,449.

Patented Aug. 14, 1917.



Inventor
Thomas W. Kirkman
By his Attorney
Robert M. Pierson

UNITED STATES PATENT OFFICE.

THOMAS W. KIRKMAN, OF NEW YORK, N. Y.

GOVERNOR FOR SPRING-MOTORS.

1,236,449.

Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed May 8, 1917. Serial No. 167,300.

To all whom it may concern:

Be it known that I, THOMAS W. KIRKMAN, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Governors for Spring-Motors, of which the following is a specification.

This invention relates to spring-propelled motors such as those used in phonographs. When the brake is applied suddenly to the edge of the turn-table, the inertia of the governor weights, whose shaft turns at about 1200 R. P. M., tends to keep them revolving, and is the cause of frequent breakage of the springs on which said weights are mounted. The object of my invention is to avoid such breakage, and to that end I provide a suitable form of slipping device or friction between the hub of the weight-supporting springs and the governor shaft which will allow the weights to keep revolving after the shaft has been stopped, until they are gradually arrested by friction.

Of the accompanying drawings, Figure 1 is a side elevation showing the governor of a talking-machine motor embodying my invention.

Fig. 2 is a horizontal section through one of the supporting posts, showing the shaft bearing and journal.

Fig. 3 is a detail elevation of the removable bearing member.

In the drawings, 1 is the horizontal governor shaft having a worm 1^a at one end, driven in the usual way by a worm-gear (not shown). 2 is the braking disk formed on a sleeve 2^a which is freely slidable along the shaft and is also adapted to rotate thereon. To this sleeve are attached by screws 3 one end of a pair of flat governor springs 4, to which latter the governor weights 5 are secured by screws 6.

7 is a collar fastened to shaft 1 by a pin 8 and 12 is another collar similarly fastened by a pin 11. Between the two collars is mounted a third collar or hub 9 to which the other ends of the springs 4 are secured by screws 10, the springs being extended at 4^a beyond said screws and frictionally engaging a conical flange 13 formed on collar 12. Hub 9 is free to turn on the shaft between the two fixed collars, except for the friction of the spring ends against said flange.

Centrifugal force, throwing the governor weights outwardly against the tension of the springs, draws disk 2 to the right, and when it encounters the felt block 19 on the end of arm 20, a further increase of speed is prevented, arm 20 being adjustable in the usual way to vary the number of revolutions per minute to which the governor holds its shaft and the turn-table geared thereto.

It will be evident that when shaft 1 is suddenly stopped by the application of the brake to the edge of the turn-table, the weights 5 will continue to revolve for a few turns until they are gradually brought to rest by the friction of the spring-ends against flange 13, and thus all danger of breaking the springs is avoided.

I further provide a noiseless and durable journal bearing for the ends of shaft 1, in the following manner constituting a preferred construction which is believed to be novel, although I do not claim it herein. The supporting posts or standards 14 are transversely apertured or bored out in line with the shaft to receive a pair of cylindrical bearing blocks 15 held in place by set-screws 16. The shaft-journals 17 occupy bearing holes 19 formed axially in the inner ends of said blocks and communicating with holes 18 formed radially or transversely therein. These holes 18 are covered by the posts 14, being located within the apertures in the latter, and they may contain a lubricant such as grease. By drilling the transverse holes 18 first, then drilling the longitudinal bearing-holes 19 and finally reaming the latter, the reamer can be run clear through the holes 19 and will cut an accurate bearing for the journals 17, wherein the latter will run noiselessly and without appreciable wear if properly lubricated.

My invention may be embodied in various forms and is not confined to the exact construction illustrated, especially with regard to the particular character of the frictional or slipping connection.

I claim:

1. In a speed regulator for talking machines, the combination of a driven shaft, a spring thereon carrying a centrifugal weight, a slipping connection between said spring and shaft, and a brake controlled by one end of said spring.

2. A centrifugal governor comprising a driven shaft, springs carrying centrifugal weights, a hub or collar to which one end

of each of said springs is attached, having a frictional slipping connection with the shaft, and a brake disk slidable on the shaft, to which the other end of each spring is attached.

5 3. A centrifugal governor comprising a driven shaft, a hub or collar rotatably mounted thereon, flat springs attached to said collar and having a frictional slipping
10 connection with the shaft, and centrifugal weights carried by said springs.

4. A centrifugal governor comprising a driven shaft, a braking disk rotatably and axially movable on said shaft, flat springs
15 attached by one end to said disk, a hub to which the other ends of the springs are at-

tached, said hub being rotatable on the shaft and the springs having terminal portions or extensions, and a collar fixed to the shaft and frictionally engaged by said spring ex- 20 tensions.

5. A centrifugal governor comprising a driven shaft, a pair of spaced collars fixed thereto, one of which has a conical flange, a third collar rotatably mounted between
25 said fixed collars, and flat springs carrying centrifugal weights and having extensions which bear frictionally against said flange.

In testimony whereof I have hereunto set my hand this 30th day of April, 1917.

THOMAS W. KIRKMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH-DIAPHRAGM,
#1,236,476-----Harold D. Penney,
Patented-August 14th, 1917.
Filed-June 28th, 1916.

H. D. PENNEY.
 PHONOGRAPH DIAPHRAGM.
 APPLICATION FILED JUNE 28, 1916.

1,236,476.

Patented Aug. 14, 1917.

FIG. 2.



FIG. 1.

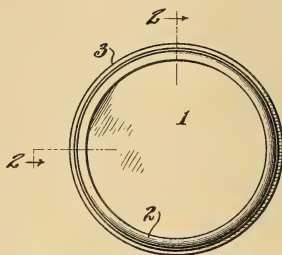


FIG. 4.

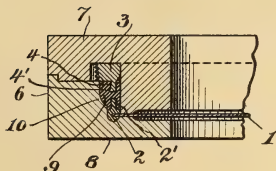
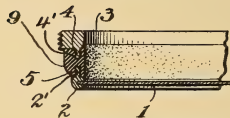


FIG. 3.



Witnesses:
Chas. E. Whitman

H. J. Siegel

Inventor:
Harold D. Penney.

By *his atty,*

J. H. Richard.

UNITED STATES PATENT OFFICE.

HAROLD D. PENNEY, OF PELHAM, NEW YORK, ASSIGNOR TO ROBERT L. McELROY, OF NEW YORK, N. Y.

PHONOGRAPH-DIAPHRAGM.

1,236,476.

Specification of Letters Patent. **Patented Aug. 14, 1917.**

Application filed June 28, 1916. Serial No. 106,303.

To all whom it may concern:

Be it known that I, HAROLD D. PENNEY, a citizen of the United States, residing in Pelham, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Phonograph-Diaphragms, of which the following is a specification.

My present invention relates to an improvement in mountings for diaphragms for talking machines and other diaphragm uses, and contemplates the use of a non-tensioning mounting for a diaphragm plate wherein the same is held in floating coöperation with its relative coöperating parts.

The main object of my invention contemplates the use of a diaphragm disk, or plate, having mounted thereon a beaded or annular connecting means, preferably, of a non-vibrating, non-yielding material and a housing mounting therefor, and the introduction therebetween of a resilient or yielding material whereby the diaphragm may be firmly anchored to its housing without metallic contact therewith, and at the same time be permitted maximum vibration.

In the drawings accompanying herewith, Figure 1 is a front elevation of my device.

Fig. 2 is a quarter sectional view taken on the lines 2-2, of Fig. 2.

Fig. 3 is an enlarged fragmental sectional view.

Fig. 4 is a sectional view of one means of mounting said diaphragm for use.

My present device has for its accomplishment the same purpose as is set forth in my copending application, Serial No. 106,304, filed June 28, 1916, wherein there is also shown the use of a resilient or yielding means between the diaphragm disk and its mounting frame or anchorage, whereby the said diaphragm is held in such floating connection as will permit of greater amplitude of movement of said diaphragm, as a whole, when in use, and as applied to phonographs, affecting a greater volume of air through such movement, and thereby increasing the tone volume, and at the same time softening the metallic tones that would occur by the use of a diaphragm supported at its peripheral edge by a rigid metallic support.

In the present modification, as indicated in the figures, I provide a diaphragm-plate, or disk 1, with a rigidly mounted beaded edge or peripheral bead-ring 2, of substan-

tially "key hole" form in cross section, having the annular securing flange 5 formed integral therewith, and extending at a right-angle, or substantially a right angle, to the inner annular peripheral diaphragm receiving-slit of the bead-ring 2; although bead-rings of other form of section may be used. In forming this bead-ring, I prefer to form the same of some material, which, while comparatively solid, is of an extrudable or plastic nature, such as lead or any of its alloys, or of other known non-resilient-like, substantially solid substance. Such bead-ring is constructed in such a manner as to have a slit in the inner peripheral wall, to receive and firmly encompass the peripheral edge, and may be firmly swaged into position thereon by the use of suitable dies; but I have not thought it essential to show or describe such operation herein.

The anchorage-ring or frame 3, by which the disk is held in position in the sound-box, may be of the customary annular form shown, or may be an integral member of the sound-box or reproducer. The frame 3 is usually provided with an annular securing-ring or flange 4, usually and preferably of the same thickness and length, and of the same diameter as is the securing-flange of the bead-ring 5, so that when the ring or frame 3 is opposite to 5, the flanges 2' and 4' will be opposed and in registry.

As in my copending application, a mold, denoted by 6, is provided, formed of two halves 7 and 8; the said mold members or halves being provided with a mold cavity 10, for holding the frame-ring 3, and the diaphragm 1, carrying the annular bead-ring 2, in operative relation; and a yielding-annular mid-ring is formed in the mold cavity of space 10, between the mold pieces 7 and 8; as shown in Figs. 3 and 4, either by vulcanization or other suitable method; so as to bind the diaphragm 1 carrying the bead-ring 2, the yielding elastic mid-ring, and the peripheral male-threaded anchorage or frame 3, into one homogeneous structure, and such mid-ring, is usually formed of pure elastic Pará rubber; and in the vulcanization of the same in the mold, as shown in Fig. 4, the rubber is firmly cemented to the flanges of metal 2' and 4' respectively, so that it requires considerable force to tear them apart.

When so formed, while not lessening to

any great extent, the vibration of the central portion of the diaphragm disk, the resilient Pará rubber of the mid-ring 10, permits of the vibration of such diaphragm as a whole.

- 5 That is, it is fixed in place upon a peripheral floating support, and by so mounting the same this leads to the displacement of a larger volume of air in the sound-box chamber, and the consequent creation of a larger
10 volume of tone.

It is obvious that many modifications may be made in the shape in cross section, or otherwise of the frame 3, of the bead-ring 2, or of the yielding securing mid-ring 10, that unifies them in a homogeneous single
15 structure, without departing from the scope of my invention.

I claim:

1. A diaphragm mounting of the class described comprising a rigid frame having a yielding annular body affixed thereto, and a diaphragm having a peripheral member embedded in said yielding body.
20

2. A diaphragm mounting of the class described, comprising a rigid frame having a yielding annular body affixed thereto, and a diaphragm having a beaded peripheral member embedded in said yielding body.
25

3. A diaphragm having a peripheral non-yielding bead attached thereto, which bead is provided with an annular securing-flange extending therefrom at a right angle to the plane of the diaphragm.
30

4. A diaphragm mounting for phonograph diaphragms, comprising a diaphragm having a non-yielding annular bead, an annular frame therefor of non-yielding material; and a yielding annular body connecting said diaphragm and said frame together.
35

5. A diaphragm mounting of the class described comprising a rigid frame having a yielding body affixed thereto, and a diaphragm having a member embedded in said yielding body.
40

6. A diaphragm mounting for phonograph diaphragms, comprising a diaphragm having a peripheral non-yielding bead thereon, and a rigid annular frame or member therefor, having a resilient material molded
45

therebetween; thereby forming a yielding body for connecting said diaphragm-bead and said frame together; whereby said diaphragm will be held in floating relation therewith.

7. The combination with an annular metallic securing member or ring, having an annular securing flange projecting from one face adjacent to the center of the periphery of the ring; a diaphragm having a peripheral bead secured thereto having a peripheral flange projecting toward the like peripheral-flange of the securing-ring; and a mid-ring formed of soft resilient material securing the flanged securing-ring and the diaphragm bead together so as to form a floating annular resilient support for the diaphragm.
55

8. A diaphragm having a member arranged to hold the edge of the diaphragm and a securing member extending from the diaphragm holding member.
60

9. A diaphragm having a member arranged to hold the edge of the diaphragm and a securing member extending from the diaphragm holding member at an angle to the plane of the diaphragm.
65

10. A diaphragm mounting of the class described comprising a rigid frame, having a securing member extending therefrom, a diaphragm having a member arranged to hold the diaphragm, and a securing member extending therefrom, and a yielding connecting member joining the securing members of the frame and diaphragm respectively.
70

11. A diaphragm mounting of the class described comprising a rigid frame having a securing member extending therefrom at right angles, a diaphragm having a member arranged to hold the diaphragm and a securing member extending therefrom at right angles, and a yielding connecting member joining the securing members of the frame and diaphragm respectively.
75

HAROLD D. PENNEY.

Witnesses:

JAMES POWER,

HENRY I. SIEGEL.

BRAKE MECHANISM FOR AUTOMATIC
INSTRUMENTS,

#1,236,542-----F.Cheney,

Patented-Aug. 14th, 1917.

Filed-Jan. 12th, 1912.

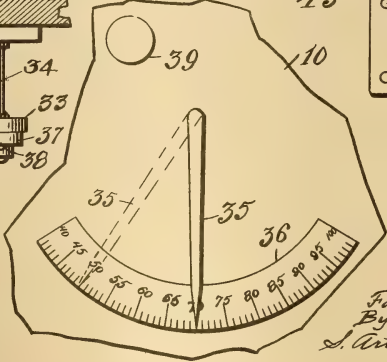
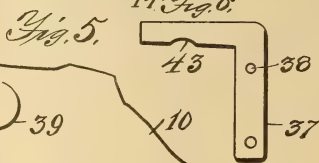
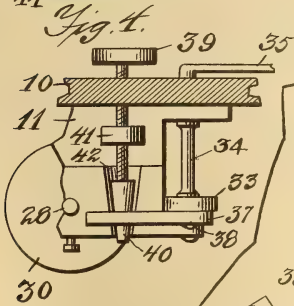
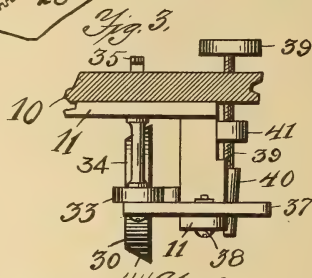
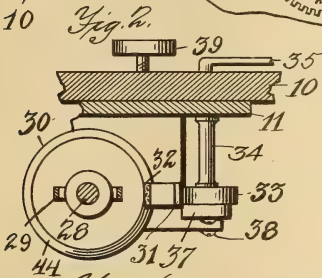
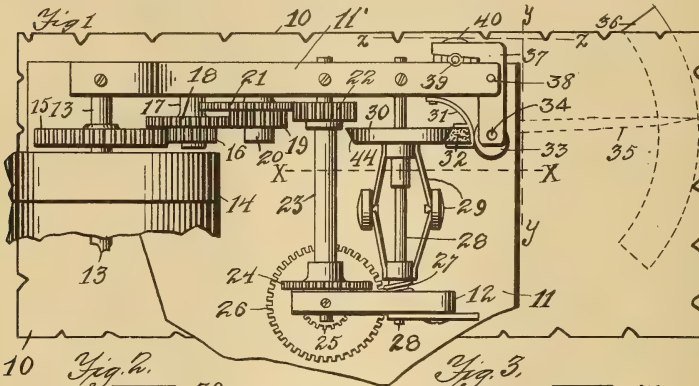
Renewed-May 5th, 1915.

F. CHENEY.

BRAKE MECHANISM FOR AUTOMATIC INSTRUMENTS.
APPLICATION FILED JAN. 12, 1912. RENEWED MAY 5, 1915.

1,236,542.

Patented Aug. 14, 1917.



Witnesses
Arthur C. Moore
H. U. Harris

Inventors
Forest Cheney
By
S. Arthur Dalling
Attorney

UNITED STATES PATENT OFFICE.

FOREST CHENEY, OF JAMESTOWN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CHENEY TALKING MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BRAKE MECHANISM FOR AUTOMATIC INSTRUMENTS.

1,236,542.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed January 12, 1912, Serial No. 670,933. Renewed May 5, 1915. Serial No. 26,137.

To all whom it may concern:

Be it known that I, FOREST CHENEY, a citizen of the United States, residing at Jamestown, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Brake Mechanism for Automatic Instruments, of which the following, taken in connection with the accompanying drawings, is a specification.

The invention relates to controlling devices for automatic instruments; and the object of the improvement is to provide simple and accurate metronomic mechanism for controlling and regulating the tempo and pitch of musical records played by automatic musical instruments.

The value of the musical composition depends entirely upon the manner in which it is rendered. To properly interpret a composition the exact pitch, as well as the correct tempo must be maintained. Accordingly, it is proposed to metronimize each record by the use of said metronomic mechanism or metrometer so that the operator will be able to set the speed of the rotating disk or cylinder in exact accord with the proper tempo, thus causing the automatic musical instrument to reproduce the composition in the same tempo and pitch in which the original record was made. The metrometer controls the rotating speed of the disk or cylinder upon which the record is played and by means of a dial and indicator the exact number of rotations per minute may be determined. This correct number of rotations per minute is placed upon the disk or cylinder and will enable any operator to know at once the correct tempo and pitch, for the tempo and pitch are controlled by the speed of rotation.

The invention consists in the construction and arrangement of the metronomic parts as described in this specification and shown in the drawings and pointed out in the claims.

In the drawings, Figure 1 is a plan view of the power mechanism for an automatic instrument showing my metronomic mechanism attached thereto. Fig. 2 is a sectional view at line X X in Fig. 1; Fig. 3 is a sectional view at line Y Y in Fig. 1; and Fig. 4 is a sectional view at line Z Z in Fig. 1 showing views of the metronomic or

controlling mechanism for the power mechanism of the instrument. Fig. 5 is a plan view of the adjusting screw and the dial of the metrometer. Fig. 6 is a detail of the angular guide plate for adjusting the cam.

Like numerals of reference refer to corresponding parts in the several views.

The numeral 10 designates the top plate of the instrument which has attached to its under side the plate 11 with bracket 11' for supporting one end of the shafts of the power or driving mechanism and the metronomic mechanism. Plate 11 has a second bracket 12 at a spaced distance from bracket 11' to hold the opposite ends of the shafts.

The main driving shaft 13 has the coil springs 14 attached thereon and a driving gear 15 which meshes in gear 16 on short shaft 17 on plate 11, which shaft 17 also has the gear 18 keyed thereon which meshes in gear 19 on short shaft 20 on plate 11. The shaft 20 also has keyed thereon the gear 21 which meshes in gear 22 on shaft 23. The shaft 23 has gear 24 thereon which meshes in gear 25, thereby turning gear 26 which meshes in worm 27 on shaft 28. The shaft 28 supports the governor 29 and a balance wheel 30. The edge 44 of the balance wheel 30 is preferably beveled to give larger bearing surface for the brake and more sure adjustment.

The metronomic mechanism consists of a spring 31 which is attached to bracket 11' at one end and has attached to its opposite end the felt block or brake shoe 32. The spring 31 normally holds the felt brake shoe 32 away from the edge 44 of the wheel 30. A cam 33 is mounted on shaft 34 and bears against the spring 31 pressing the brake shoe 32 against the beveled edge 44 of the balance wheel 30. The shaft 34 extends up through plates 10 and 11 and is turned to form an indicator 35 or has an indicator 35 attached thereto, which indicator extends to scale or dial 36; the other end of the shaft 34 is pivotally mounted in the end of angular lever plate 37. The plate 37 is pivotally attached at 38 on bracket 11' about midway of its length so that the two ends of the lever may move reciprocally back and forth on the pivotal mounting. The pivotal movement of the plate 37 is only for the exact adjustment of cam 33, which adjustment is attained by means of a screw 39 which has

a cone-shaped end 40 and is mounted through plate 10 and a projecting lug 41 on bracket 11'. The cone-shaped end 40 bears against a curved opening 42 in the side of bracket 11' on one side and against a curved opening 43 in the side of angular plate 37. It is apparent that screw 39 may thus adjust the position of plate 37 with great accuracy as the beveled end 40 of screw 39 presses down between bracket 11' and plate 37, or is withdrawn from between said parts, thereby moving the end of plate 37 and the cam 33 nearer to or farther from spring 31.

It is now apparent that the pointer 35 may be turned to any point on the dial 36 desired by actuation of the screw 39 and that a predetermined pressure will be placed upon the balance wheel 30 thereby controlling the governor and causing it to move at a predetermined speed, and that said speed may be determined and adjusted with great accuracy by means of the screw 39 and plate 37.

On the dial in Fig. 5 the pointer 35 stands at 70 which means that the metrometer will control the rotating speed of the disk or cylinder upon which the record is played so that it will rotate 70 times per minute. A composition which should be played in that tempo would have the numeral 70 placed on the disk or cylinder and the operator will have only to turn the pointer 35 to the numeral 70 on the dial in order to have the composition correctly rendered, both as to tempo and pitch by the automatic instrument. Should the correct speed of the original record be 50 revolutions of the disk or cylinder per minute, the pointer should be turned as shown in dotted line on the dial, thereby insuring the correct rendering of the composition in the same tempo and pitch in which the original record was made.

I claim as new:

1. In a device of the class described, suitable driving mechanism, a governor for said driving mechanism, a balance wheel on said governor, a spring pressing away from said balance wheel, a brake shoe on said spring, a cam to press said brake shoe against said balance wheel, a pointer to turn said cam, a dial for said pointer, and mechanism for graduating the adjustment of said cam with accuracy.

2. In a device of the class described, driving mechanism, a governor for said driving mechanism comprising a balance wheel, a pivotally mounted arm, a brake shoe mounted independently of said arm and adapted to bear against said balance wheel, means carried on one end of said arm for pressing said brake shoe against said balance wheel with a predetermined pressure, and means coöperating with the opposite end of said

arm to adjust said means for pressing said brake shoe against said balance wheel.

3. In a device of the class described, power mechanism, a governor for said power mechanism, a balance wheel on said governor, a spring pressing away from said balance wheel, a brake shoe on said spring, a cam to press said spring and brake shoe against said balance wheel, a pointer attached to said cam for turning the same, a dial for said pointer to determine the speed of said mechanism, a plate pivotally mounted and supporting said cam and pointer on one end, and a screw with a cone-shaped end between the other end of said plate and the supporting frame to graduate the adjustment of said cam in its relation to said brake shoe.

4. In a device of the class described, a driving mechanism, a governor for said driving mechanism, a balance wheel on said governor, a spring pressing away from the balance wheel, a brake shoe on the end of said spring, and means for pressing the brake shoe against said balance wheel with an adjustable predetermined pressure.

5. In a device of the class described, driving mechanism, a governor for said driving mechanism, a disk on said governor, a brake shoe to coact with said disk, means unattached to and contacting with said brake shoe to adjust the pressure of the brake shoe on said disk, and independent adjusting means to vary the effect of said first-named means.

6. In a device of the class described, driving mechanism, a governor for said driving mechanism comprising a balance wheel, a spring pressing away from said balance wheel, a brake shoe carried by said spring, and a cam to press said brake shoe against said balance wheel.

7. In a device of the class described, driving mechanism, a governor for said driving mechanism, a balance wheel on the governor, a brake shoe adapted to coact with the balance wheel, a spring by which said brake shoe is carried, and adjustable means coacting with said spring to vary the pressure of the brake shoe on said balance wheel.

8. In a device of the class described, driving mechanism, a governor for said driving mechanism, a balance wheel on the governor, a brake shoe adapted to coact with the balance wheel, a spring by which said brake shoe is carried, adjustable means coacting with said spring to vary the pressure of the brake shoe on said balance wheel, and separately controlled means to graduate the adjustment of the adjustable means.

9. In a device of the class described, driving mechanism, a governor for said driving mechanism, a balance wheel on said governor, a brake shoe adapted to coact with the balance wheel, a spring by which the brake

shoe is carried, a cam coacting with said spring to vary the pressure of the brake shoe on said balance wheel, a shaft upon which the cam is mounted, and means to adjust the position of said shaft to regulate the adjustment of the cam.

10. In a device of the class described, driving mechanism, a governor for said driving mechanism, a balance wheel on said governor, a brake shoe adapted to coact with the balance wheel, a cam adapted to press said brake shoe against the balance wheel, means to rotate said cam, and means to move the cam bodily toward and away from the brake shoe.

11. In a device of the class described, driving mechanism, a governor for said driving mechanism, a balance wheel on said governor, a spring pressing away from said balance wheel, a brake shoe on said spring, a cam to press the brake shoe against the balance wheel, a combined handle and pointer to rotate the cam, and a dial over which the handle and pointer move.

12. In a device of the class described, a balance wheel, a brake shoe adapted to co-

act with said balance wheel, means tending normally to move said brake shoe out of contact with said balance wheel, adjustable means to press said brake shoe against said balance wheel in opposition to the action of said first named means, and independent adjusting means to vary the effect of said second named means.

13. In a device of the class described, a rotatively mounted disk, a brake shoe adapted to co-act with said disk, an angular lever mounted adjacent said disk, means carried by one arm of said lever for pressing said brake shoe against said disk, a fixed support adjacent the other arm of said lever, and adjustable means interposed between said fixed support and said other arm to vary the position of said first named arm with respect to said disk.

In testimony whereof I have affixed my signature in the presence of two witnesses.

FOREST CHENEY.

Witnesses:

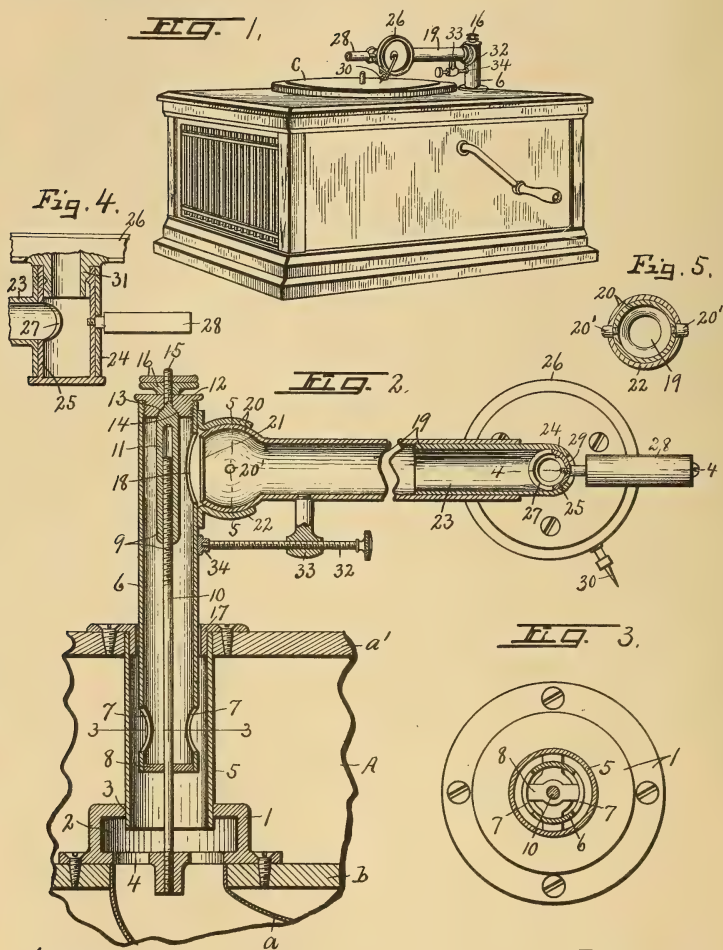
A. W. KETTLE,
H. U. HARRIS.

TONE-ARM FOR PHONOGRAPHS,
#1,236,644-----Willard G. Adams,
Patented-August 14th, 1917.
Filed-August 30th, 1915.

W. G. ADAMS.
TONE ARM FOR PHONOGRAPHS.
APPLICATION FILED AUG. 30, 1915.

1,236,644.

Patented Aug. 14, 1917.



WITNESSES:
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H. E. Chace

INVENTOR
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UNITED STATES PATENT OFFICE.

WILLARD G. ADAMS, OF WEEDSPORT, NEW YORK.

tone-arm for phonographs.

1,236,644.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed August 30, 1915. Serial No. 47,995.

To all whom it may concern:

Be it known that I, WILLARD G. ADAMS, a citizen of the United States of America, and resident of Weedsport, in the county of Cayuga, in the State of New York, have invented new and useful Improvements in Tone-Arms for Phonographs, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in sound reproducing machines, commonly known as phonographs, involving the use of a reproducer carrying a stylus which coöperates with the record to reproduce the sound from such record, and refers more particularly to the resonator for transmitting the sound-waves produced by the vibrations of the diaphragm of the reproducer.

It is well known that the sound impressions produced in different standard makes of records vary materially in angle, both laterally and vertically with reference to the surface of the disk or cylinder, and that unless the stylus of the reproducer is properly adjusted to such angle, the result must be excessive wear or mutilation of the record and objectionable stridulation or grating sound, and I have discovered that the frequent criticisms of otherwise perfect instruments of this character is largely due to improper adjustment of the stylus of the reproducer with reference to the angle of production of impressions upon the records.

The main object, therefore, of my present invention is to enable the stylus of the reproducer to be closely adjusted to the angle of production of the impressions upon the record while the machine is in operation so that the reproduced sound will be practically free from such stridulations and will, therefore, represent more closely the original sounds or tones.

Another object is to enable the same reproducer and resonator to be used in connection with any standard make of sound reproducing machine.

Other objects and uses relating to specific parts of the device will be brought out in the following description.

In the drawings—

Figure 1 is a perspective view of a simple form of phonograph embodying the features of my invention.

Fig. 2 is an enlarged detail sectional view,

partly broken away, of the resonator carrying the reproducer.

Fig. 3 is a sectional view taken on line 3—3, Fig. 2.

Figs. 4 and 5 are detail sectional views taken, respectively, in the planes of lines 4—4, and 5—5, Fig. 2, but on a slightly reduced scale.

This resonator is adapted to be used in connection with any suitable form of amplifier as —a— and comprises a hollow base —1— covering the reduced end of the amplifier —a— and provided with a relatively large circular chamber —2— and an inlet —3— and an outlet —4—, the latter communicating directly with the interior of the amplifier —a—.

The inlet —3— is preferably circular and co-axial with the base —1— in the upper side thereof, and serves to receive the lower end of an upright tube —5— which is of relatively smaller diameter than that of the chamber —4— and serves to receive the lower end of another upright tube —6— which is of still smaller diameter than that of the interior of the tube —5—, and is adapted to be adjusted vertically in a manner presently described, the lower end of the tube —6— being provided with radial openings —7—, the combined area of which is somewhat greater than the cross sectional area of the interior of the tube —6—.

The purpose in making the interior of the tube —5— of relatively larger diameter than that of the tube —6—, and also in making the chamber —2— of relatively larger diameter than that of the tube —5— is to form intervening amplifying chambers to give greater fullness or volume to the sound as it emerges into the amplifier —a— by permitting the sound waves to enlarge in transit from the main column or tube —6— to the amplifier.

The lower end of the tube —6— below the radial openings —7— is closed by a cap or plug —8—, the effect of which appears to be to increase the fullness of the sound waves by retarding their direct passage to the amplifier.

As illustrated, the base —1— is supported directly upon a horizontal partition —b— of a case —A— having an upper wall or top —a'— to which the upper end of the tube —5— is secured, said tube extending through the inlet opening —3— in the upper wall of the base —1— and fits more or less

tightly therein so as to allow the sound waves to pass freely into the chamber —2— and thence into the amplifier.

The tube —6— is supported by sectional
5 rod —9— extending centrally through the base —1— and tubes —5— and —6— and consisting of a lower section —10— and an upper section —11—, the lower section being permanently secured by screw-connection
10 with the lower side of the base —1—, as shown in Fig. 2, and is provided with a threaded upper end to which the section —11— is adjustably connected by screw engagement.

The tube —6— is provided at its upper end with a screw cap —12— having a central semi-spherical seat —13— in its lower face for receiving a similarly formed shoulder —14— on the section —11— so that the
20 tube —6— and parts carried thereby are supported directly upon the section —11— of the rod —9— and by turning said section in one direction or the other, the tube —6— and parts carried thereby may be
25 raised and lowered at will, the upper end of the section —11— being reduced and threaded at —15— for engagement by suitable lock nuts —16— by which the tube —6— is firmly held in place against vibration or rattling, it being understood that the lower
30 portion of the tube —6— is slidably fitted in the hollow head as —17— of the tube —5— to permit the vertical adjustment referred to.

The upper end of the tube —6— just below the cap —12— is provided in one side with a relatively large radial opening —18— in direct communication with the interior of
40 a laterally projecting tube —19— which is connected to the tube —6— by a hinge-joint —20— to allow the tube —19— to be tilted to different angles relatively to the axis of the tube —6—, the inner end of the tube —19— being provided with a relatively
45 large opening —21— for the purpose of maintaining communication with the opening —18— in any position of adjustment of the tube —19—.

The lateral tube —19— is provided with
50 a telescoping extension —23— fitted sufficiently tight to prevent accidental turning, but which may be turned by hand to permit it to be adjusted rotarily and axially for properly positioning the stylus of the
55 reproducer on the record, said extension terminating in a T-shaped head —24— in which is journaled a tubular sleeve —25— carrying the reproducer —26— and having a radial opening —27— communicating with the interior of the tube —19— through the
60 extension.

A radially projecting weighted arm —28— is secured to the side of the sleeve —25— opposite the opening —27— and plays in a
65 vertical slot —29— in the adjacent side of

the head —24— and serves to rock the reproducer —26— in one direction for holding its stylus as —30— in contact with the record disk under a slight pressure, the fit between the sleeve —25— and head —24—
70 being sufficiently loose to permit it, together with the reproducer, to be adjusted rotarily by the weight.

The reproducer —26— is provided with a hub —31— frictionally fitted within one end
75 of the sleeve —25— with sufficient friction to cause the reproducer to turn with the sleeve, or rather to prevent relative turning of the sleeve and reproducer under the weight of the arm —28— when the stylus
80 is engaged with the record disk, but may be turned by hand relatively to said sleeve in removing and replacing it from and upon the sleeve or when it is desired to change the angle of the stylus relatively to the sleeve of
85 the record disk, the hub of the reproducer being connected to the sleeve against endwise displacement by any of the well known forms of bayonet locks or joints so that it may be easily and quickly removed or re-
90 placed at will.

In adjusting the reproducer so as to change the angle of the stylus relatively to the surface of the record disk, it, of course, becomes necessary to raise or lower the tone
95 arm which may be readily done by turning the section —11— of the rod —9— in one direction or the other, as may be required, or the lateral arm —19— may be adjusted vertically by separate means, as a screw
100 —32—, engaging in a threaded aperture in a bracket —33— on the arm —19— and having its inner end provided with a foot —34— resting against the periphery of the upright tube —6— so that by turning the
105 screw —32— in the proper direction, the reproducer will be raised or lowered.

The radial opening —27— in the sleeve —25— is of substantially the same diameter as that of the interior of the extension
110 —23—, and by connecting the hub of the reproducer and sleeve in the manner described so that they may be adjusted relatively to each other, it is evident that the sleeve may be adjusted rotarily as a valve
115 to vary the size of the communicating opening between said sleeve and tone arm —19— for subduing the tone if desired, as for example when the instrument is being played in a small room without changing the angle
120 of the stylus, it being understood that the slot —29— in the head of the lateral arm —19— or extension —23— is of sufficient length to permit a limited rotary adjustment of said sleeve for this purpose as well as for
125 the purpose of allowing the weight —28— to hold the stylus to the record disk under a slight pressure.

What I claim is:

1. In a phonograph, in combination with 130

a record, an amplifier supported in a plane below that of the record, a tone arm having an upright section communicating with the amplifier, and an extensible support for said section passing vertically therethrough and provided with means at the top for adjusting its length.

2. In a phonograph, the combination with an amplifier and a record disposed in a plane above the amplifier, of a tone arm comprising a hollow base in direct communication with the amplifier, a vertically adjustable upright tube communicating with the base, means within said tube for adjusting the same vertically, a lateral tube carried by the upright tube and communicating therewith, and a reproducer mounted on the lateral tube.

3. In a phonograph, in combination with an amplifier and a record disposed in a plane above the amplifier, an upright tube in communication with the base, a lateral tube hinged to the upright tube and communicating therewith, adjustable connections between said tubes, for adjusting the lateral tube upon its hinge-joint, and a reproducer mounted on the lateral tube.

4. In a phonograph, the combination with an amplifier and a record disk disposed in a plane above the amplifier, of a tone arm comprising a hollow base in direct communication with the amplifier, a vertically adjustable upright tube communicating with the base, adjustable connections between the upright tube and base and extending through the upright tube for raising and lowering said upright tube, a lateral tube attached to and communicating with the upright tube and movable vertically therewith, and a reproducer mounted on the lateral tube.

5. In a phonograph, in combination with an amplifier and a record disk disposed in a plane above the amplifier, a hollow base

surrounding the small end of the amplifier and communicating therewith, a stationary tube projecting upwardly from and communicating with the base, a vertically adjustable tube projecting into the stationary tube and adjustable connections between the base and top of the adjustable tube and extending through both tubes for supporting said adjustable tube.

6. A tone arm for phonographs comprising a hollow base having its interior chamber of relatively large area and provided with an air exit for communication with an amplifier, a vertically adjustable upright tube of sufficiently smaller external diameter than that of the interior of the base to form an intervening air chamber and communicating with said base, extensible connections between the base and tube for supporting and adjusting said tube, a lateral tube attached to and communicating with the upright tube at a point some distance below its upper end, and a reproducer mounted on the lateral tube.

7. A tone arm for phonographs comprising a hollow base having means for communication with an amplifier, a rod secured to and rising from the base and having its upper end provided with a vertically adjustable extension, an upright tube supported by said extension and communicating with the hollow base, a lateral tube hingedly connected to the upright tube and communicating therewith, means for adjusting the lateral tube about the axis of its hinge connection, and a reproducer mounted on the lateral tube.

In witness whereof I have hereunto set my hand this 21st day of August, 1915.

WILLARD G. ADAMS.

Witnesses:

H. E. CHASE,

ALICE M. CANNON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

START AND STOP DEVICE FOR
TALKING MACHINES,

#1,236,893-----C.E.Woods,

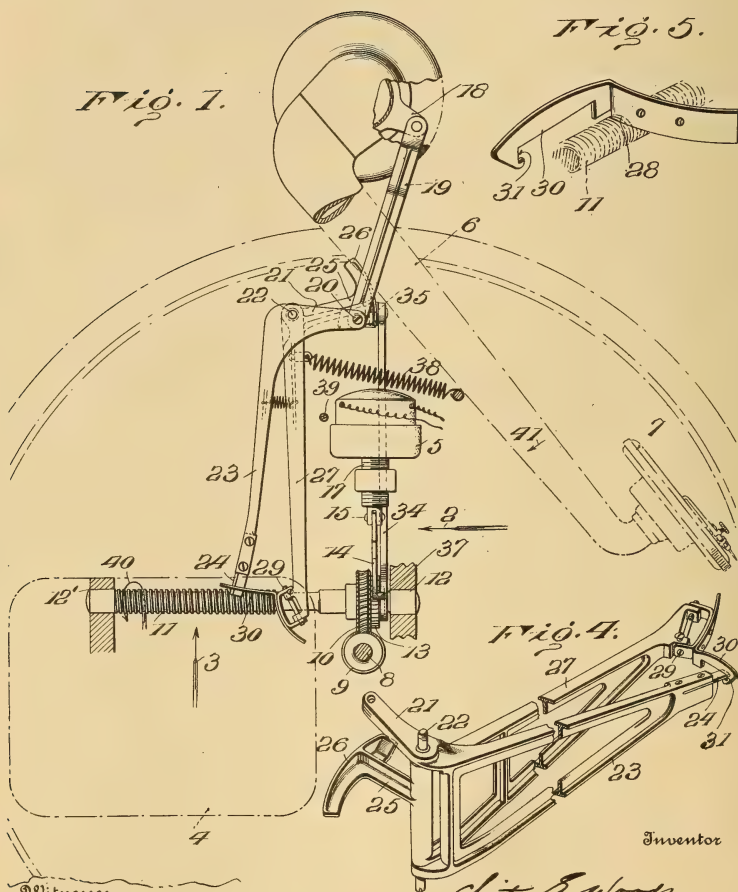
Patented-August 14th, 1917.
Filed-September 9th, 1913.

C. E. WOODS.
 START AND STOP DEVICE FOR TALKING MACHINES.
 APPLICATION FILED SEPT. 9, 1913.

1,236,893.

Patented Aug. 14, 1917.

3 SHEETS—SHEET 1.



Witnesses
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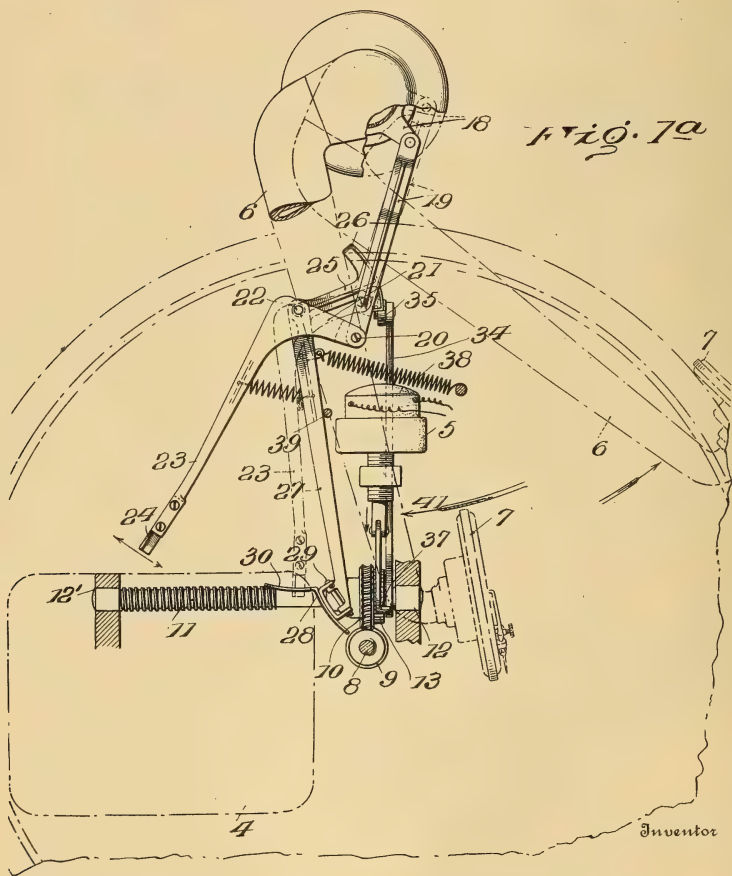
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

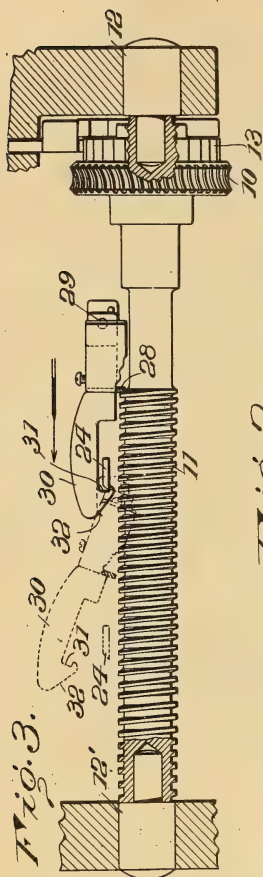
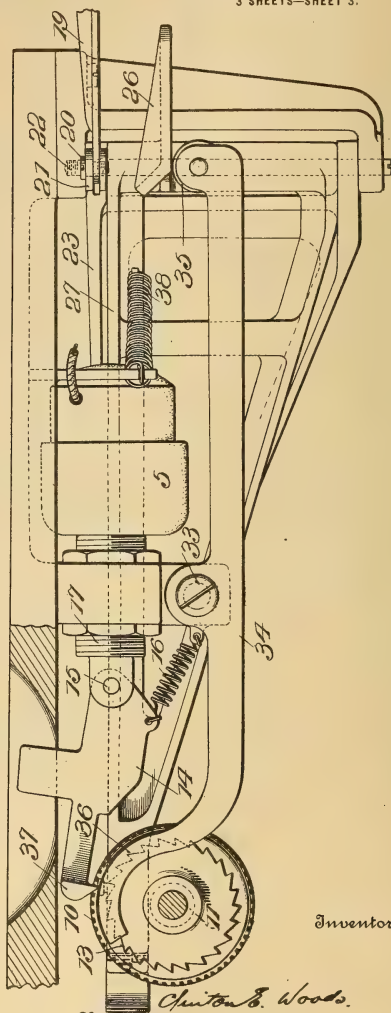


Fig. 2.



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UNITED STATES PATENT OFFICE.

CLINTON E. WOODS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO AMERICAN GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF WEST VIRGINIA.

START AND STOP DEVICE FOR TALKING-MACHINES.

1,236,893.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed September 9, 1913. Serial No. 788,827.

To all whom it may concern:

Be it known that I, CLINTON E. WOODS, of Bridgeport, Connecticut, have invented a new and useful Improvement in Start and Stop Devices for Talking-Machines, which invention is fully set forth in the following specification.

This invention relates to automatic stop mechanism, and especially to mechanism for automatically stopping a talking machine, and also, preferably, automatically starting the same, being designed more particularly for use in connection with that class of talking machines in which a tone-arm or other tubular sound conductor, together with the reproducer, is advanced across the face of a disk record in the act of reproducing said records; an object in view is to provide a talking machine with means whereby the machine shall be automatically started when the operator places the reproducer and tone-arm in position to commence reproduction, and which shall also automatically stop the motor when, for any reason, the reproducer and tone-arm shall cease their advance movement across the face of the record, or when their speed of advance shall be materially varied, as, for instance, decreased below a predetermined limit. For example, when the reproducer reaches the interior end of the spiral record groove (by which groove it is advanced across the record), the advance movement of the reproducer and the tone-arm ceases, and it is one object of the present invention to stop the motor at the same time that the reproducer reaches the end of the record.

With this object in view, the preferred embodiment of the invention consists, (in a talking machine) of a motor for driving a rotative element, as the record, and the usual or any suitable tone-arm provided with any desired reproducer, with a stop mechanism such as means controlling the application of power to the motor, which means is operative to permit the supply of power to the motor while the tone-arm is moved by the record, but which automatically acts to cut-off power from the motor when the tone-arm ceases to advance, or its speed of advance is materially varied, as, for instance, decreased below a predetermined limit. Thus for ex-

ample, if an electric motor be employed, a switch is provided for switching the current onto or off from the motor, which switch is automatically closed to permit current to pass to the motor when the tone-arm is placed in position to begin the reproduction of the record, said switch being maintained in closed position to permit current to pass to the motor so long as the tone-arm continues to advance across the record, but being automatically opened to cut off current from the motor when the tone-arm ceases for any reason to advance across the face of the record, as it would cease, for example, when it reaches the end of the interior convolution of the record groove. It will thus be seen that the closing and opening of the switch to start and stop the motor is controlled by the tone-arm, thus avoiding the annoying necessity heretofore existing for the operator to first throw the switch and supply power to the motor; then to place the reproducer in position; and, when the reproduction has ceased, to open the switch to stop the motor. By the use of the present invention, the operator need pay no attention whatever to the switching on and off of the current, since these functions are automatically performed when the tone-arm is placed in position on the record and when it ceases to advance.

A machine embodying the invention is provided with a rotating element adapted to carry the record, and a traveling element in the form of a tone-arm and reproducer adapted to be propelled by the rotating element through the engagement of the needle of the reproducer with the grooves of the record. A suitable motor is provided for driving the rotating element, and a suitable mechanism is provided for controlling the movement of the motor and the rotating element, this mechanism serving to automatically stop the said movement when the advance of the traveling element across the rotating element ceases, and preferably also serving to start the said movement when the traveling element is moved to a position adjacent the periphery of the rotating element. The start-and-stop mechanism preferably comprises a device which acts directly on the motor, serving to control the input of power

thereto, but it will be understood that the invention is not limited to a start-and-stop device of this form and that wide variation may be made in this part of the structure without departing from the spirit of the invention.

The inventive idea involved is capable of receiving a variety of mechanical expressions, one of which, for the purpose of illustrating the invention, is shown in the accompanying drawings, but it is to be expressly understood that such drawings are for the purpose of illustration only and are not designed to define the limits of the invention, reference being had to the appended claims for this purpose.

In said drawings—

Figure 1 is a top plan view of the automatic start-and-stop mechanism constituting the present invention with the switch closed; and Fig. 1^a a like view with the switch open;

Fig. 2 is a detail side elevation looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is a detail side elevation looking in the direction of the arrow 3 in Fig. 1;

Fig. 4 is a perspective view of certain of the parts; and

Fig. 5 is a broken perspective of a further detail.

Referring to the drawings, in which like reference numerals indicate corresponding parts, 4 is a motor, preferably electric; 5 is a switch of any suitable or desired construction controlling the flow of current to said motor, this switch constituting the start-and-stop device above referred to; 6 is a tone-arm of the usual or any suitable construction; and 7 is a reproducer of any desired form having the usual needle for engaging the convolutions of the record groove of the well-known disk form of record. The said tone-arm and reproducer constitute the aforesaid traveling element, and the said record with its support constitutes the aforesaid rotating element which propels the traveling element.

A controlling means is provided for the start-and-stop device, in this case the switch 5; this controlling means comprising in part an actuating mechanism which will now be described. A shaft 8 driven by the motor is operatively connected, as by a worm 9 and worm-gear 10, with a worm shaft 11 having bearings 12, 12', in the frame of the motor. Keyed to said worm shaft 11 is a ratchet wheel 13 which is in position to be engaged by a pawl 14 pivotally connected, at 15, to the projecting end of the switch 5. Said pawl may be actuated either by gravity or by a spring 16, Fig. 2, to cause it to engage the ratchet wheel 13, and when it so engages said ratchet, the revolution of the shaft 11 acts through the pawl 14 to pull the switch arm 17 into the position shown in Fig. 1^a,

and thereby open the switch and prevent the passage of current to the motor, said opening movement of the switch being against the tension of a spring (not shown) within the switch, this being a usual or well-known form of switch. When the pawl 14 is freed from the ratchet wheel 13, the switch is closed (see Fig. 1) under the action of its spring and current passes to the motor. It will thus be seen that when the pawl is in engagement with the ratchet wheel, the switch is open, the current cut off, and the motor brought to a stop, and when the pawl is disengaged from the ratchet wheel, the switch is automatically closed and the current turned onto the motor.

The controlling means for the start-and-stop device also comprises mechanism whereby the pawl 14 will be automatically released from the ratchet in order to start the motor and automatically brought into engagement with the ratchet to stop the motor (all under the control of the tone-arm) and this mechanism will now be described. It comprises two movable members which normally engage each other and travel synchronously. One of these members is connected with the motor and the rotating element by means independent of the start-and-stop device, the said means preferably being positive in its action. The other member is driven from the traveling element.

As shown, the tone-arm is mounted to turn around a vertical axis in a horizontal plane and has projecting radially therefrom, preferably in a plane below the turntable of the machine, a lug or arm 18, Fig. 1, to which there is pivotally connected a link 19, the other end of which is pivotally connected, at 20, to one arm 21 of a bell-crank lever pivoted, at 22, to the framework of the machine and having its other arm 23 extending forward and in close proximity to the worm shaft 11, being provided on its extremity adjacent said worm shaft 11 with a reduced knife edge 24, Figs. 1 and 3. Also mounted on the pivot 22 is a second bell-crank lever, on one of whose arms 25 is a cam 26, the other arm 27 projecting forward and over the worm shaft 11 where it is provided with a tooth 28, best shown in Figs. 3 and 5, for engaging the worm on the shaft 11. Said tooth, as here shown, is mounted on a frame pivotally connected, at 29, to the lever arm 27, and a latch 30 extends forward from said tooth toward the knife edge 24 of the lever arm 23 and is provided with a notch 31 for engagement with said knife edge, as clearly illustrated in full lines in Fig. 3. The extreme forward end of the latch 30 is provided on its under side with a cam face 32 for a purpose which will be hereinafter described.

The said arm 23 of the first bell-crank

lever constitutes a movable member connected with the tone-arm or traveling element, and the said arm 27 of the second bell-crank lever constitutes a movable member connected with the motor or the rotating element.

Pivoted at 33, Fig. 2, to any suitable support is a lever 34 whose right-hand end, as shown in Fig. 2, is provided with an anti-friction roller 35 in a position to be engaged by the cam 26 on the lever arm 25, and the left-hand end of said lever 34 is curved, as shown at 36, and is positioned under a lug 37 projecting laterally from the side of the pawl 14, so that when said lever 34 is depressed at the right of Fig. 2 by engagement of the cam 26 with the anti-friction roller 35, the curved end 36 of said lever is elevated, thereby lifting the pawl 14 out of engagement with the ratchet 13, and when the cam 26 is out of contact with the anti-friction roller 35, the curved end 36 of the lever 34 is permitted to fall, thus permitting the pawl 14 to come into engagement with the ratchet 13.

The pitch of the worm shaft 11 is such that it advances the tooth 28 and with it the lever arm 27 along said worm shaft 11 at the same speed as the tone-arm advances the knife-edge 24 when said tone-arm is being moved across the face of the record by the convolutions of the record groove, and since the knife edge 24 and the latch 30 with the knife edge in the notch 31 advance simultaneously and at the same rate of speed, it is apparent that the knife edge cannot escape from the notch 31 as long as the two continue to advance together. When, however, the tone-arm ceases to advance, as would be the case when the reproducer needle has reached the interior end of the record groove, the revolutions of the worm shaft 11 continue to advance the tooth 28 and with it the latch 30 until the latch-notch 31 is advanced away from the knife edge 24, whereupon the revolutions of the worm shaft 11 acting upon the tooth 28 serve to rock the latch 30 on its pivot 29, throwing it up free from the knife edge 24 and also simultaneously disengaging the tooth 28 from the worm. As soon as the tooth is thus disengaged from the worm, a spring 38, Fig. 1, acts to draw the lever arm 27 back (to the position shown in Fig. 1^a) against any suitable stop 39. At the commencement of the operation or engagement of the tooth 28 with the worm 11, the cam 26 has impinged upon the roller 35 on the lever 34 and elevated the end of the lever under the pawl 14, thus lifting the pawl out of engagement with the ratchet 13 and permitting the switch to be closed under the influence of its spring to turn on the current to the motor, and as long as the tooth 28 continues to advance along the worm

shaft 11, the cam 26 continues thus to act upon the lever 34 and maintain the curved end thereof, and with it the pawl 14, in elevated position. But as soon as the spring 38 has retracted the arm 27 and the tooth 28, when it has become freed from the worm 11 as just described, the cam 26 is withdrawn from the roller 35 on the lever 34 and the pawl 14 engages the ratchet wheel 13, whereupon the continued revolution of the shaft in the direction indicated by the arrow 40 (Fig. 1) acts to open the switch 5 against the tension of its spring, thus cutting off the current from the motor and stopping the same. Should the momentum of the parts be such as to be liable to impose undue strain upon the switch or the pawl and ratchet, the continued revolution of the ratchet acts to throw the pawl upward; it then starts to retract under the influence of the switch spring and again falls into contact with the next tooth on the ratchet 13, thus maintaining the switch in open position without any undue or breaking strain upon the parts.

It will be apparent from the foregoing description that the controlling means for the start-and-stop device becomes immediately active upon the stopping of the advance of the tone-arm or traveling element, it being unnecessary for any preliminary movements to take place before the movements which ultimately result in the actuation of the stop device.

It will also be apparent that the controlling means for the start-and-stop device will become immediately active upon a material variation of the speed of advance of the tone-arm or traveling element, such as a material decrease in its speed of advance, for in such event, tooth 28 may advance latch 30 relatively to knife-edge 24 until latch-notch 31 is moved away from the knife-edge, whereupon the related parts will operate as above explained, to effect the stopping of the machine.

When the parts have thus been brought to a stop by the opening of the switch (see Fig. 1^a), the lever arm 23 with its knife edge 24 and the lever 27 with its tooth 28 will occupy the position indicated in full lines in Fig. 1^a, but when the operator takes hold of the tone-arm and moves it from the central portion of the record outwardly to its inoperative position (which latter position is shown in dotted lines in Fig. 1^a), the lug 18 acting through the link 19 on the lever arm 21 serves to retract the lever arm 23 from the full line position shown in Fig. 1^a to the dotted line position, and the knife edge 24 striking upon the cam nose 32 of the latch 30 lifts the same on its pivot until the knife edge passes beyond the lower lip of the notch 31, whereupon said latch 30 immediately falls. When the tone-arm is

again advanced by the operator in the direction indicated by the arrow 41 to again begin a reproduction, the movement of the tone-arm advances the lever arm 23 from right to left (Fig. 1*), carrying with it the lever arm 27 and the tooth 28 by reason of the connection between the two arms due to the latch 30, and this results in the cam 26 impinging against the roller 35 on the lever 34 and elevating the curved end 36 of said lever, thereby lifting the pawl 14 free from the ratchet 13, whereupon the spring of the switch 5 closes the switch and starts the motor, this occurring at the instant when the tooth 28 comes in contact with the commencement of the worm on the shaft 11, as shown in Figs. 1 and 3. Thereupon the tone-arm and the two lever arms 23 and 27 are advanced together as before described.

It will be observed that if the tone-arm stops or materially decreases its speed at any time or at any place while in contact with the record, whether because it reaches the end of the record or for any other reason, the worm 11 will continue to advance the tooth 28, release the latch 30, and permit the lever arm 27 to be returned by the spring 38 against the stop 39 and the cam 26 to be thrown out of contact with the lever 34, thereby permitting the curved end 36 of the lever to fall and with it the pawl 14, and the switch to be opened as just hereinbefore described.

It will also be observed that the lever arm 27, through the medium of the cam 26, acts to absolutely control the switch 5 and that the position of said lever arm 27 determines whether or not the switch 5 is closed to turn on current to the motor, or is open to cut off said current and stop the motor. It will also be observed that as long as the tone-arm 6 is being advanced by the record, the lever arm 23 and the lever arm 27 advance as one member and serve to leave the switch closed, but that the instant the tone-arm ceases to advance or its speed of advance is materially decreased, the two lever arms 23 and 27 no longer act as a unit, since the lever arm 23 stands still, or is relatively retarded, while the lever arm 27 advances, which difference results in disconnecting the two lever arms and freeing the lever arm 27 from the control of the worm 11, permitting the spring 38 to supplementally move the said lever arm 27, which action results in the engagement of the pawl 14 with the ratchet and the opening of the switch by the power of the motor itself. The switch being open, its spring is not strong enough to revolve the shaft 11, which shaft is locked against such action by the engagement of the worm-gear 10 with the worm 9 on the shaft 8.

While the invention has been described with some particularity as to the construc-

tion, proportions, and relative arrangements of the parts, it is not to be understood that the invention is limited to such construction, proportions and relative arrangements, since these may be varied within the limits of the appended claims, without departing from the invention.

What is claimed is:—

1. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with means for cutting off power from the motor and means moving with the traveling element and rendering said first means operative upon the stopping of the traveling element.

2. The combination of a motor, a rotating element driven thereby, a relatively traveling element propelled by the rotating element, motor-actuated means for cutting off power from the motor, and devices controlled by the traveling element and holding said motor-actuated means inactive during the movement of the traveling element by the rotating element.

3. The combination of a motor, a rotating element driven thereby, and a relatively traveling element propelled by the rotating element, with motor-actuated means for cutting off power from the motor, a device holding said motor-actuated means out of operative relation with the motor during the movement of the traveling element by the rotating element, and means freeing said motor-actuated means when the traveling element ceases to advance across the rotating element whereby power is cut off from the motor when the traveling element ceases to advance.

4. The combination of a motor, a rotating element driven thereby, and a relatively traveling element propelled by the rotating element, motor-actuated means for cutting off power from the motor but normally out of operative relation therewith, a motor-driven member holding said motor-actuated means out of operative relation with the motor during the advance of the traveling element by the rotating element, and a member actuated by the traveling element holding said motor-driven member in operative relation with the motor while the traveling element is propelled by said rotating element.

5. The combination of an electric motor, a normally-closed switch controlling the passage of current thereto, a rotating element driven by the motor, and a traveling element propelled by the rotating element, with two synchronously-moving members, one of which is actuated by the motor and the other by the traveling element, said motor-actuated member being held in operative relation with the motor by the member that is actuated by the traveling element during the advance movement of the traveling ele-

ment, and motor-actuated switch-opening means held out of operative relation with the motor by said motor-actuated member during the advance movement of the traveling
5 element.

6. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with motor-actuated means controlling the application of power to the motor, a motor-actuated member controlling said means, and a member actuated by the traveling element controlling said motor-actuated member while the traveling element is moved by the
10 rotating element but freeing said motor-actuated member when the rotating element ceases to advance the traveling element.

7. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with a device controlling the application of power to the motor, means for connecting said device to the motor whereby it is actuated to cut off power from the motor, restraining means normally holding said last-named means out of operative relation with the motor, a motor-driven member controlling said restraining means, and a member driven by the traveling element holding said
15 motor-driven member in operative relation with the motor while the traveling element is advanced by the rotating element but freeing said motor-driven member when the traveling element ceases to advance whereby
30 the power is cut off from the motor when the rotating element ceases to move the traveling element.

8. The combination of a motor, a rotating element driven thereby, a traveling element
40 propelled by the rotating element, a device controlling the application of power to the motor, connections between said device and the motor for cutting off power from the motor, motor-controlled means holding said
45 connections inoperative during the movement of the traveling element by the rotating element, and means controlled by the traveling element and in turn controlling said motor-controlled means.

9. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with a device controlling the application of power to the motor, connections between said device and the motor for operating the device to cut off power from the motor, restraining means normally holding said connections out of operative relation with the motor, a lever actuated by the motor and holding said
50 restraining devices in restraining position, and a lever connected to the traveling element and to said motor-operated lever when the traveling element is advanced by the rotating element and acting to hold said motor-operated lever in operative relation with
65

the motor during the movement of the traveling element but permitting said motor-operated lever to be disconnected from the motor when the traveling element ceases to advance, and means shifting said motor-operated lever to free said restraining means when the motor-operated lever is disconnected from said lever operated by the traveling element.

10. The combination of a motor, a rotating element driven thereby, a traveling element propelled by the rotating element, and a device for cutting off power from the motor, two independently movable members, one of which is moved by the motor and the other by the traveling element, and means rendered operative by the stopping of one of said movable members to render said power-cut-off device operative to stop the motor.

11. The combination of a motor, and a device for cutting off power therefrom, with a rotating element driven by the motor and a traveling element propelled by the rotating element, two independently movable members, one of which is moved by the motor and one by the traveling element, and means rendered operative by the stopping of said member operated by the traveling element to render the power-cut-off device operative to cut off power from the motor.

12. The combination of a motor, a device for cutting off power from the motor, a rotating element driven by the motor, and a traveling element propelled by the rotating element, with two independently movable levers, one of which is moved by the motor and one by the traveling element, means connecting the lever operated by the traveling element to the motor-operated lever while the traveling element is moved by the rotating element but automatically disconnecting said levers when the movement of said traveling element ceases, and means controlled by the motor-operated lever and permitting said power-cut-off device to be operated to cut off power from the motor when said levers are disconnected.

13. The combination of a motor, a power-cut-off device therefor, a rotating element driven by the motor, and a traveling element, with two independently movable members, one of which is actuated by the motor and the other by the traveling element, means connecting said members together so that they move simultaneously when the traveling element is advanced by the rotating element but acting automatically to disconnect said members when the traveling element ceases to advance, and means independent of the motor for reversing the movement of said motor-actuated member when said members are disconnected and rendering said power-cut-off device operative to cut off power from the motor.

14. The combination with a rotating element and a traveling element propelled thereby, of a motor-driven stop device, and controlling means therefor comprising motor-driven means actuated independently of the stop device and automatically rendering said stop device operative upon the stopping of the traveling element.

15. The combination with a rotating element and a traveling element propelled thereby, of a stop device and controlling means therefor comprising two members normally moving in continuous engagement with each other and separately actuated independently of the stop device by the said rotating and traveling elements respectively, said members automatically disengaging upon the stopping of said traveling element to render said stop device operative.

16. The combination with a rotating element and a traveling element propelled thereby, of a stop mechanism for the rotating element comprising a member positively driven therefrom and a member continuously actuated by the traveling element, while so actuated continuously engaging the first said member, and means controlled by one of said members for holding the stop mechanism inactive, said members automatically disengaging upon the stopping of said traveling element to render said stop mechanism active.

17. The combination with a motor, a motor-driven rotating element and a traveling element propelled by the rotating element, of a stop device, a motor-driven member holding said stop device out of operation during the advance of the traveling element, and a member actuated by the traveling element holding said motor-driven member in operative relation with the motor while the traveling element is advanced by the rotating element.

18. The combination with a motor, a motor-driven rotating element and a traveling element propelled by the rotating element, of two synchronously-moving members, one of which is actuated by the motor and the other by the traveling element, said motor-actuated member being held in operative relation with the motor by the member that is actuated by the traveling element during the advance movement of the traveling element, and a motor-actuated stop device held out of operative relation with the motor by said motor-actuated member during the advance movement of the traveling element.

19. The combination with a motor, a motor-driven rotating element and a traveling element propelled by the rotating element, of a motor-actuated stop device, a motor-actuated member controlling the stop device, and a member actuated by the traveling element and controlling the said motor-actuated member while the traveling element is

advanced by the rotating element but freeing said motor-actuated member when the rotating element ceases to advance the traveling element.

20. The combination with a motor, a motor-driven rotating element and a traveling element propelled by the rotating element, of a stop device, connections between the motor and the said device for actuating the latter, a motor-controlled means holding said connections inoperative during the advance of the traveling element by the rotating element, and means controlled by the traveling element and in turn controlling said motor-controlled means.

21. The combination with a motor, a stop device, a motor-driven rotating element and a traveling element propelled by the rotating element, of two independently movable levers, one of which is moved by the motor and one by the traveling element, means connecting the lever operated by the traveling element to the motor-operated lever while the traveling element is advanced by the rotating element but automatically disconnecting said levers when the advance of said traveling element ceases, and means controlled by the motor-operated lever and causing the stop device to be operated when said levers are disconnected.

22. The combination with a motor, a stop device, a motor-driven rotating element and a traveling element propelled by the rotating element, of two independently movable members one of which is actuated by the motor and the other by the traveling element, means connecting said members together so that they move simultaneously when the traveling element is advanced by the rotating element by acting automatically to disconnect said members when the traveling element ceases to advance, and means independent of the motor for reversing the movement of said motor-actuated member when said members are disconnected and rendering the stop device operative.

23. The combination with a rotating element and a traveling element normally propelled thereby, of a start-and-stop device and controlling means therefor actuated independently thereof and automatically serving to cause the said device to stop the rotating element upon the stopping of the traveling element and to cause the said device to start the rotating element upon movement of the traveling element to a position adjacent the periphery of the rotating element.

24. The combination with a rotating element and a traveling element normally propelled thereby, of start-and-stop mechanism serving to automatically stop the rotating element upon the stopping of the traveling element and to automatically start the rotating element upon the movement of the trav-

eling element inward to its initial position from a position outside the periphery of the rotating element.

25 25. The combination with a motor, a motor-driven rotating element and a traveling element normally propelled by the rotating element, of mechanism automatically serving to cut off power from the motor upon the stopping of the traveling element and to admit power to the motor upon movement of the traveling element inward to its initial position from a position outside the periphery of the rotating element.

15 26. The combination with an electric motor, a motor-driven rotating element and a traveling element normally propelled by the rotating element, of a switch in the motor circuit and controlling means for the switch automatically serving to open the switch upon the stopping of the traveling element and to close the switch upon movement of the traveling element inward to its initial position from a position outside the periphery of the rotating element.

25 27. The combination with a rotating element and a traveling element propelled thereby, of a start-and-stop mechanism serving to automatically stop the rotating element upon the stopping of the traveling element and to maintain it idle when the traveling element is moved outward to its extreme position and to automatically start the rotating element upon movement of the traveling element inward from its outer position.

35 28. The combination with a motor, a rotating element driven by the motor and a traveling element propelled by the rotating element, of a start-and-stop mechanism automatically serving to cut off power from the motor upon the stopping of the traveling element and to keep the power cut off when the traveling element is moved outward to its extreme position and to admit power to the motor upon movement of the traveling element inward from its outer position.

45 29. The combination with an electric motor, a rotating element driven by the motor and a traveling element propelled by the rotating element, of a switch in the motor circuit and controlling means for the switch automatically serving to open the switch upon the stopping of the traveling element and to maintain the switch open when the traveling element is moved outward to its extreme position and to close the switch upon movement of the traveling element inward from its outer position.

60 30. The combination with a rotating element and a traveling element propelled thereby, of a normally inoperative stop device for the rotating element, actuating means for the stop device automatically tending to become operative, and means dependent on the continued movement of the

traveling element for holding the said actuating means inoperative and adapted upon subsequent manual movement of the traveling element inward from its outer position to release the actuating means and permit the stop device to become inoperative.

31. The combination with a rotating element and a traveling element normally propelled thereby, of mechanism serving to automatically stop the rotating element upon the rotating element ceasing to propel the traveling element and to automatically start the rotating element upon movement of the traveling element inward from a position outside the periphery of the rotating element.

32. The combination with a rotating element and a traveling element propelled thereby, of a normally inoperative stop device for the rotating element and controlling means for the stop device comprising a ratchet wheel rotatable with the rotating element, a pawl automatically engageable with the ratchet wheel, an operating connection between the pawl and the stop device, and means dependent on the continued movement of the traveling element for holding the pawl out of engagement with the ratchet wheel.

33. The combination with a rotating and a traveling element propelled thereby, of a normally inoperative stop device for the rotating element and controlling means for the stop device comprising a ratchet wheel rotatable with the rotating element, a pawl automatically engageable with the ratchet wheel, an operating connection between the pawl and the stop device, a lever for holding the pawl out of engagement with the ratchet wheel, and means dependent on the continued movement of the traveling element for holding the lever in its pawl-engaging position, the said means being adapted upon subsequent manual movement of the traveling element to restore the lever to its pawl-engaging position.

34. The combination with a rotating element and a traveling element, of a stop device, a member movable with the rotating element and controlling said stop device, a pivoted latch on the said member, and a member movable with the traveling element and while so moving engaging the latch, thereby causing the first said member to hold the stop device inoperative.

35. The combination with a rotating element and a traveling element, of a screw movable with the rotating element, a latch engageable with the screw, a movable member to which the latch is pivoted, a stop device held inoperative by the said member while the latch engages the screw, and a member movable with the traveling element and while so moving engaging the latch to hold it in engagement with the screw,

36. The combination with a rotating element and a traveling element, of a stop device, a screw movable with the rotating element, a member moved in one direction by the screw and controlling said stop device, a member movable with the traveling element and while so moving maintaining the connection between the said screw and the first said member, thereby causing the first said member to hold the stop device inoperative, and means for moving the first said member when disconnected from the screw to cause the stop device to operate.

37. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with means controlling the application of power to the motor, a member controlling said means, and a member actuated by the traveling element controlling said first-named member while the traveling element is moved by the rotating element but freeing said first-named member when the rotating element ceases to advance the traveling element.

38. The combination with a motor, a motor-driven rotating element and a traveling element normally propelled by the rotating element, of mechanism automatically serving to cut off power from the motor upon the stopping of the traveling element and to admit power to the motor upon the movement of the traveling element to a position adjacent the periphery of the rotating element.

39. The combination with a rotating element and a traveling element propelled thereby, of two members moved as a unit by said elements respectively, other means moving one of said members independently of the other upon the stopping of one of said elements, and a stop device controlled by said last-named member.

40. The combination with a rotating element and a traveling element propelled thereby, of two members moved as a unit by said elements respectively, other means moving one of said members independently of the other upon a decrease in speed below a predetermined limit of one of said elements, and a stop device controlled by said last-named member.

41. The combination with a rotating element and a traveling element propelled thereby, of two members moved as a unit by said elements respectively, other means moving one of said members independently of the other upon a predetermined variation in speed of one of said elements, and a stop device controlled by said last-named member.

42. In combination with a rotating element and a traveling element propelled thereby, of means moving with said traveling element, means rotated with said rotating element, stop mechanism, and controlling devices therefor comprising a member nor-

mally engaging both of said means and supplementarily moved independently thereof.

43. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with means for cutting off power from the motor, and means moving with the traveling element and rendering said means operative upon the speed of the traveling element decreasing below a predetermined limit.

44. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with means for cutting off power from the motor, and means moving with the traveling element and rendering said means operative upon the stopping of said traveling element.

45. The combination with a motor, a motor-driven rotating element and a traveling element propelled by the rotating element, of a motor-actuated stop device, a motor-actuated member controlling said stop device, and a member actuated by the traveling element and controlling the said motor-actuated member while the traveling element is advanced normally by the rotating member but freeing said motor-actuated member when the speed of said traveling element decreases below a predetermined limit.

46. The combination with a motor, a motor-driven rotating element and a traveling element propelled by the rotating element, of a motor-actuated stop device, a motor-actuated member controlling said stop device, and a member actuated by the traveling element and controlling the said motor-actuated member while the traveling element is advanced normally by the rotating member but freeing said motor-actuated member upon a predetermined variation in speed of said traveling element.

47. The combination of a motor and a device for cutting off power therefrom, with a rotating element driven by the motor and a traveling element propelled by the rotating element, two independently movable members, one of which is moved by the motor and one by the traveling element, and means rendered operative by the speed of one of said members decreasing below a predetermined limit to render the power-cut-off device operative to stop the motor.

48. The combination of a motor and a device for cutting off power therefrom, with a rotating element driven by the motor and a traveling element propelled by the rotating element, two independently movable members, one of which is moved by the motor and one by the traveling element, and means rendered operative by a variation in speed of one of said members to render the power-cut-off device operative to stop the motor.

49. The combination with a rotating element and a traveling element propelled thereby, of a motor-driven stop device, and

controlling means therefor comprising a motor-driven means actuated independently of the stop device and automatically rendering said stop device operative upon the speed of said traveling element decreasing below a predetermined limit.

50. The combination of a motor, a rotating element driven thereby and a traveling element propelled by the rotating element, with means for cutting off power from the motor, and means moving with the traveling element and rendering said means operative upon a predetermined variation in speed of said traveling element.

51. The combination of a rotating element and a traveling element propelled thereby, with a motor-driven stop device and controlling means therefor comprising a motor-driven means actuated independently of the stop device and automatically rendering said stop device operative upon a predetermined variation in speed of said traveling element.

52. The combination of a rotating element and a traveling element propelled thereby, with a motor-driven stop device and controlling means therefor comprising a motor-driven means actuated independently of the stop device and automatically rendering said stop device operative upon the stopping of said traveling element.

53. The combination of a motor, a rotating element driven thereby, and a traveling element propelled by the rotating element, with means for cutting off power from the

motor and means moving with the traveling element and rendering said means operative upon a predetermined variation in the speed of the traveling element.

54. In combination with a rotating member, operating mechanism therefor, and a traveling member, a stop member, means adapted to have movement with the traveling member and arranged to affect the stop member, and means having operative relation with said last-mentioned means whereby said means is given a secondary movement when normal movement of the traveling member is prevented, so that the stop member is operated.

55. In combination, a motor, a traveling element, a member moved by said motor, a member moved by said traveling element, a stop device controlled by one of said members, means coacting with both of said members while said traveling element continues its normal travel, and means supplementarily moving one of said members to effect the actuation of said stop device upon cessation of the normal travel of said traveling element.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CLINTON E. WOODS.

Witnesses:

JOHN R. PETRIE,
JOHN S. GRIFFITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

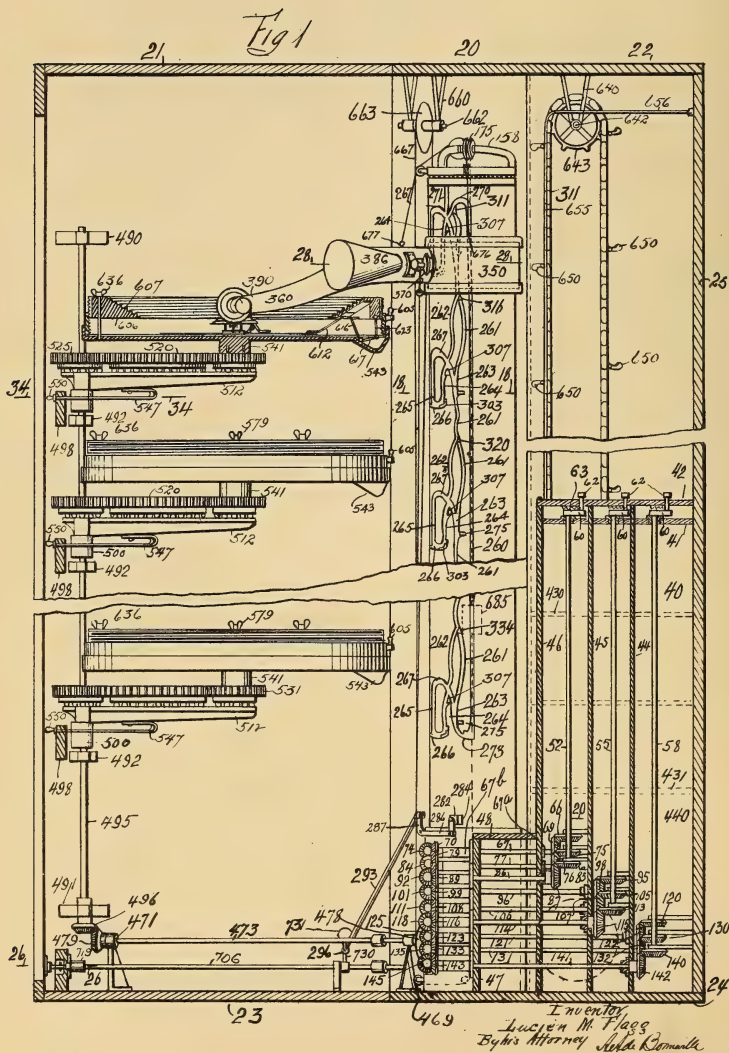


AUTOMATIC DISK REPEATING
PHONOGRAPH.

#1,236,920-----Lucien M. Flagg,
Patented-August 14th, 1917.
Filed-May 31st, 1916.

1,236,920.

8 SHEETS—SHEET 1.

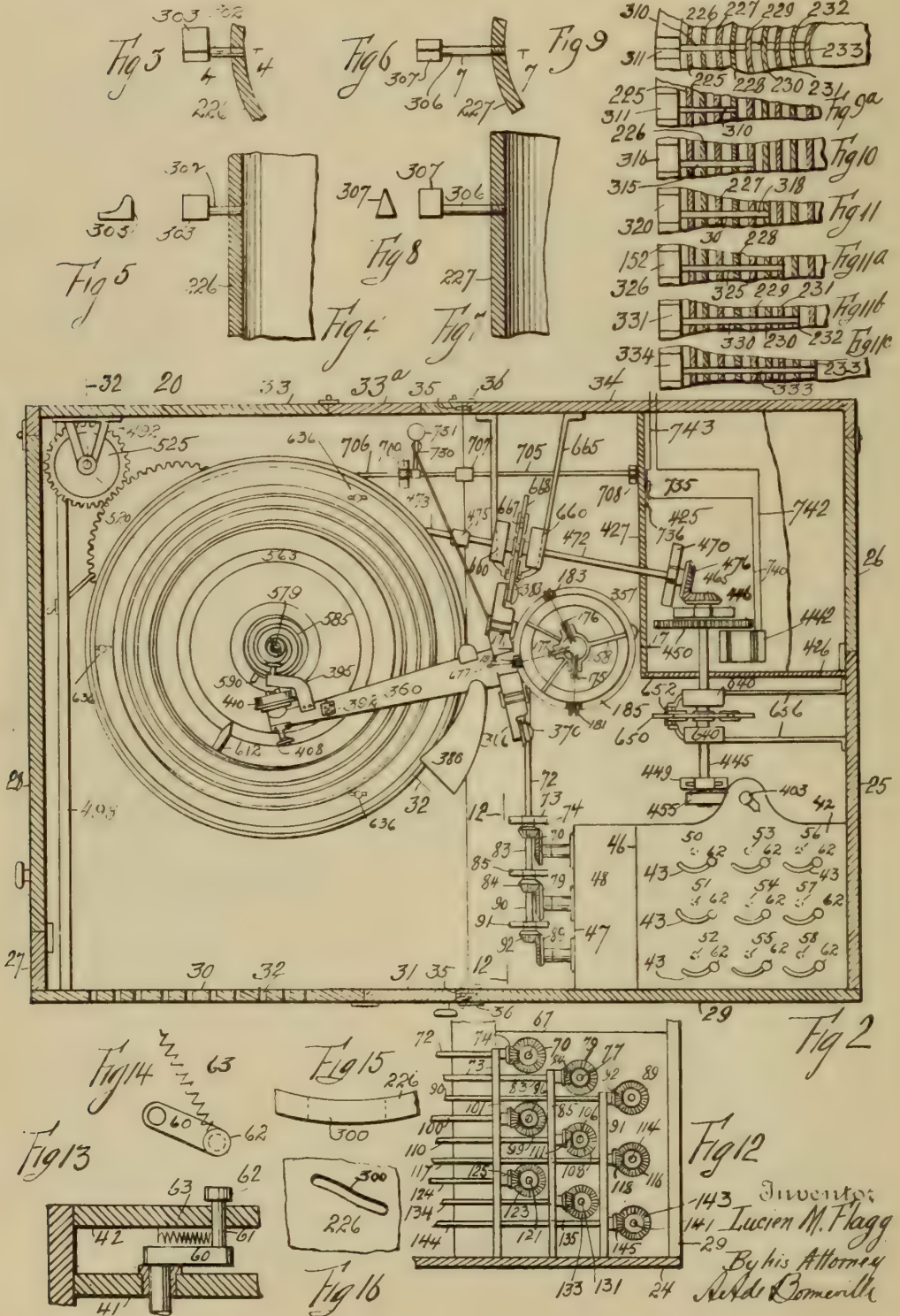


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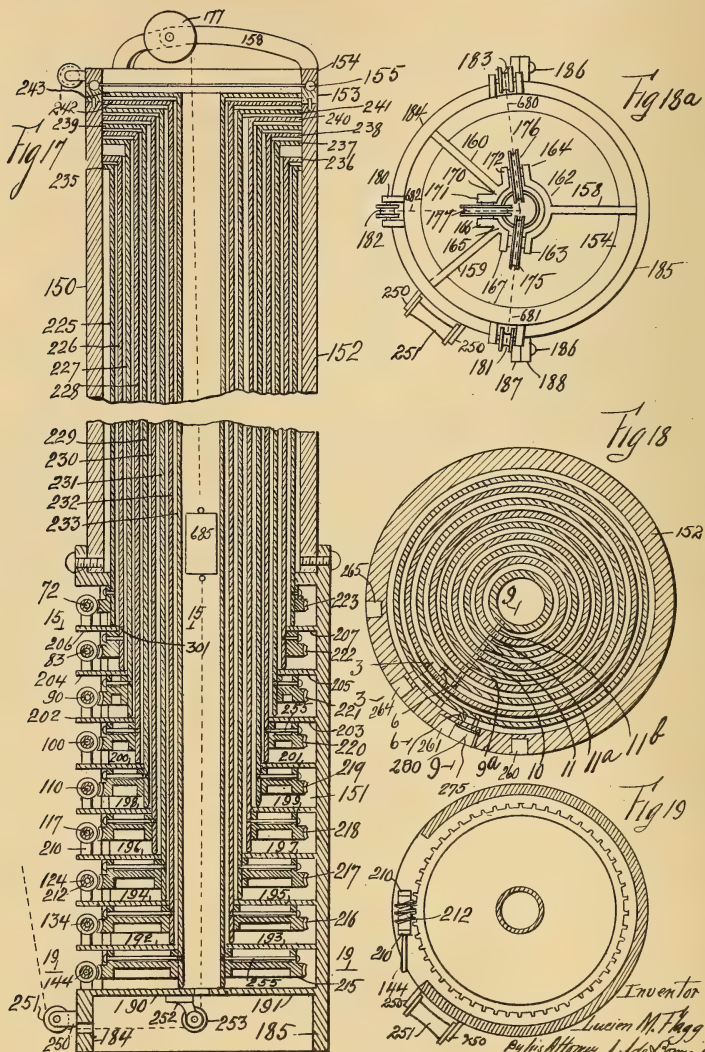
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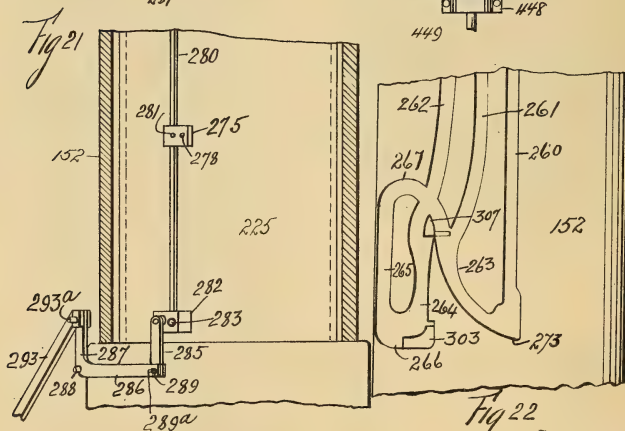
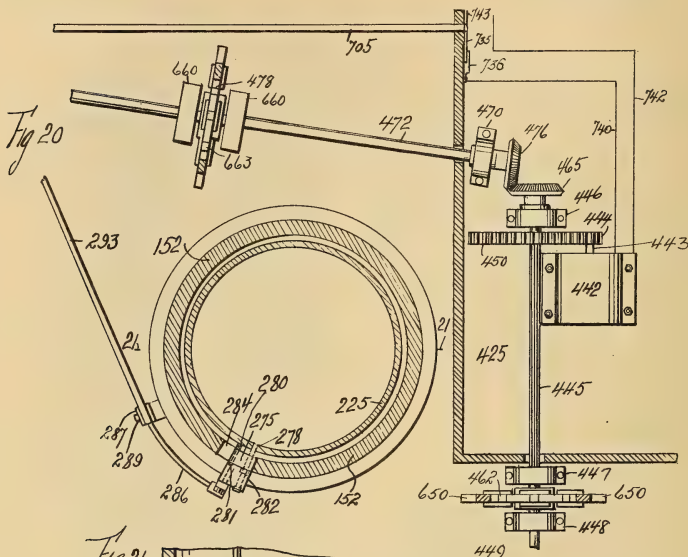


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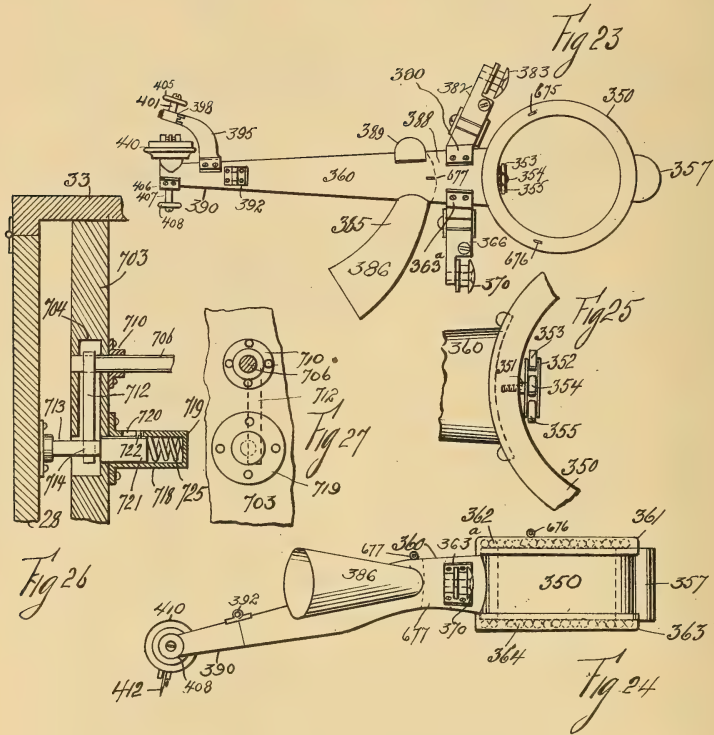


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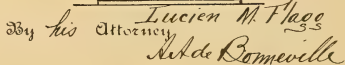
Patented Aug. 14, 1917.
 8 SHEETS—SHEET 5.



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8 SHEETS—SHEET 6.

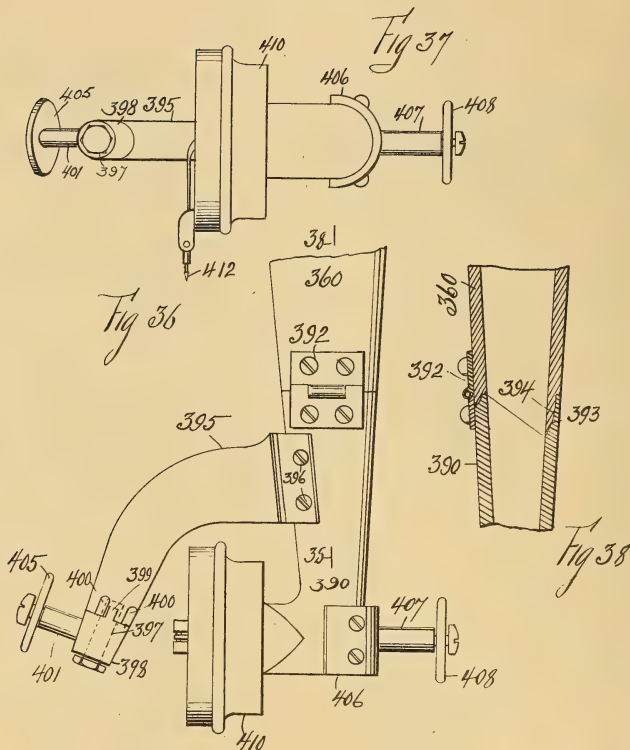


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 8 SHEETS—SHEET 7.



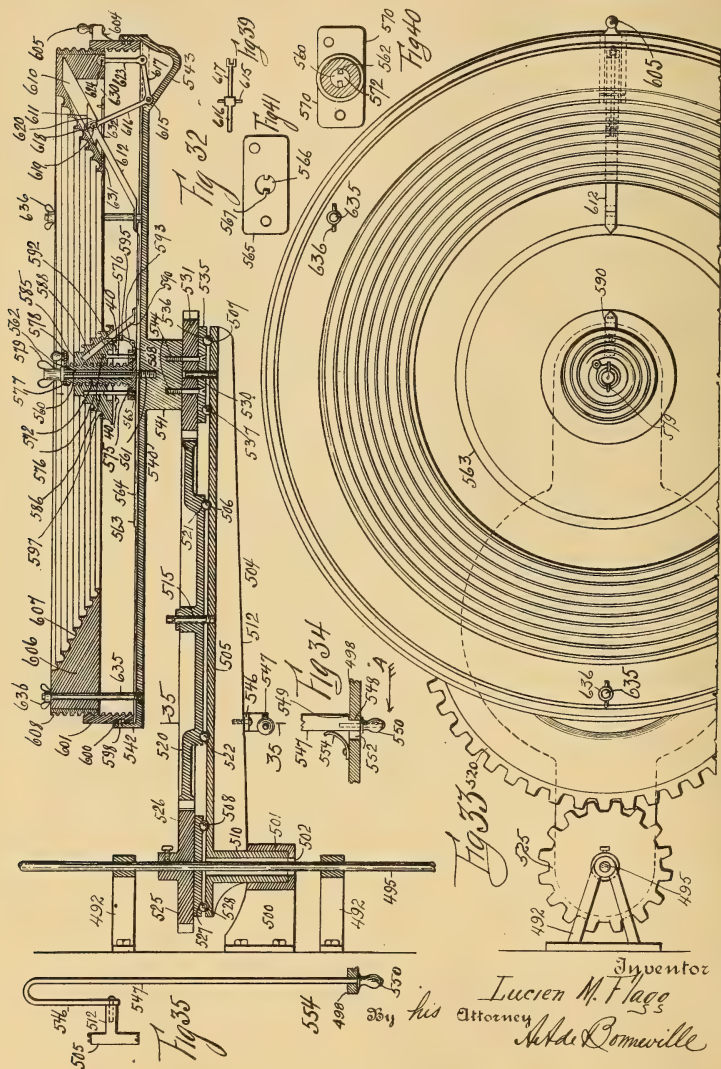
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8 SHEETS—SHEET 8.



UNITED STATES PATENT OFFICE.

LUCIEN M. FLAGG, OF YONKERS, NEW YORK.

AUTOMATIC DISK REPEATING PHONOGRAPH.

1,236,920.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed May 31, 1916. Serial No. 100,844.

To all whom it may concern:

Be it known that I, LUCIEN M. FLAGG, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Automatic Disk Repeating Phonographs, of which the following is a specification.

This invention relates to automatic disk repeating phonographs. The principal object of the invention is to provide means for playing a plurality of disk records in continuous succession, in selective succession, or repeating a selected record a number of times. All of these operations are controlled by the operator from a single controller board. The invention further provides means for rendering the device portable and easily knocked down. Other objects will be fully described hereinafter.

Referring to the drawings Figure 1 represents a partial elevation of the invention with the portions sectioned and partly diagrammatic; Fig. 2 represents a top plan view of the invention in part section; Fig. 3 represents a partial section as on the line 3—3 of Fig. 18; Fig. 4 represents a partial section as on the line 4—4 of Fig. 3; Fig. 5 represents a partial left hand view of an element of Fig. 3; Fig. 6 represents a partial section as on the line 6—6 of Fig. 18; Fig. 7 represents a partial section as on the line 7—7 of Fig. 6; Fig. 8 represents a fragmentary left hand end view of Fig. 7; Fig. 9 represents a partial section as on the line 9—9 of Fig. 18; Fig. 9^a represents a partial section as on the line 9—9^a of Fig. 18; Fig. 10 represents a partial section as on the line 9—10 of Fig. 18; Fig. 11 represents a partial section as on the line 9—11 of Fig. 18; Fig. 11^a represents a partial section as on the line 9—11^a of Fig. 18; Fig. 11^b represents a partial section as on the line 9—11^b of Fig. 18; Fig. 12 shows a fragmentary sectional view of Fig. 2 as on the line 12—12; Fig. 13 represents a fragmentary portion of Fig. 1; Fig. 14 shows a top plan view of some of the elements of Fig. 13; Fig. 15 shows a partial enlarged section as on the line 15—15 of Fig. 17; Fig. 16 represents a front elevation of Fig. 15; Fig. 17 represents an enlarged section as on the line 17—17 of Fig. 2; Fig. 18 represents a partial section as on the line 18—18 of Fig. 1; Fig. 18^a shows a top plan view of Fig. 17

when not sectioned; Fig. 19 represents a partial section as on the line 19—19 of Fig. 17; Fig. 20 represents an enlarged partial plan and section as on the line 20—20 of Fig. 1; Fig. 21 represents an elevation and partial section as on the line 21—21 of Fig. 20; Fig. 22 represents an enlarged fragmentary portion of Fig. 1; Fig. 23 represents an enlarged top plan view of some of the elements shown in Fig. 2; Fig. 24 represents a front elevation of Fig. 21; Fig. 25 represents an enlarged fragmentary portion of Fig. 23; Fig. 26 represents an enlarged partial section as on the line 26—26 of Fig. 1; Fig. 27 represents a fragmentary right hand view of Fig. 26 when not sectioned; Fig. 28 represents a partial enlarged top plan view and section as on the line 28—28 of Fig. 1; Fig. 29 is a front elevation partly in section of Fig. 28; Fig. 30 represents a partial section as on the line 30—30 of Fig. 28; Fig. 31 shows a fragmentary left hand view of Fig. 29; Fig. 32 represents an enlarged fragmentary section as on the broken line 32—32 of Fig. 2; Fig. 33 shows a top plan view of Fig. 32 when not sectioned; Fig. 34 shows an enlarged fragmentary top plan view and partial section as on the line 34—34 of Fig. 1; Fig. 35 represents an enlarged portion partly sectioned as on the line 35—35 of Fig. 32; Fig. 36 shows an enlarged fragmentary portion of some of the details of Fig. 2; Fig. 37 shows a front end view of Fig. 36; Fig. 38 shows a partial section of Fig. 36 as on the line 38—38; Fig. 39 shows an enlarged top plan view of some of the elements of Fig. 32; Fig. 40 shows an enlarged section as on the line 40—40 of Fig. 32; Fig. 41 shows an enlarged top plan view of some of the elements shown in Fig. 32.

Referring to the drawings and particularly to Fig. 1 and Fig. 2, a casing for the preferred form of the invention is indicated in its entirety by the numeral 20 and comprises the roof with the portions 21 and 22, the bottom having the portions 23 and 24, the side 25 with the door 26, the side 27 with the door 28, the front wall with the portions 29 and 30, the latter having the door 31 and perforations 32, the rear wall or back with the portions 33 and 34, with the door 33^a in the portion 33. The portions of the casing 20 are held together by means of the pins 35 and hooks 36.

In the casing 20 is located a controller cabinet indicated in its entirety by the nu-

meral 40, having the horizontal partition 41 and the roof 42, with segmental openings 43. Vertical walls 44 and 45 are provided for the controller cabinet 40. A side wall 46 is provided for said cabinet 40. An extension with the side wall 47 and roof 48 is built with the controller cabinet 40.

In the controller cabinet 40 are journaled a plurality of vertical controller shafts 50, 51, 52, 53, 54, 55, 56, 57, and 58.

At the upper end of each of the controller shafts 50, 51, 52, 53, 54, 55, 56, 57, and 58; there is fastened an arm 60, that carries the standard 61 and operating knob 62. A spring 63 is attached to the standard 61 and the roof 42. The spring 63 is so attached that when the arm is in its central position, the said spring 63 is parallel to said arm 60 and is at its maximum tension.

To the lower end of the shaft 50 is secured the bevel gear 66. A horizontal shaft 67 is journaled in the bearings 67^a and 67^b connected respectively to the walls 46 and 47, and has fastened at one end the bevel gear 69 which meshes with the bevel gear 66; and at the other end has fastened thereto the bevel gear 70. A horizontal shaft 72 has one end supported in the journal bracket 73 and has fastened thereto the bevel pinion 74 which meshes with the bevel gear 70.

To the lower end of the shaft 51 is secured the bevel gear 75 in mesh with the bevel gear 76 on the shaft 77 similar to the shaft 67. The shaft 77 has fastened to the other end the bevel gear 79. The horizontal shaft 83 has fastened at one end thereof, the bevel pinion 84 which meshes with the bevel gear 79. One end of the latter shaft is supported in the journal bracket 85.

The vertical shaft 52 has fastened to its lower end the bevel gear 85^a. A horizontal shaft 86 similar to 67 has fastened to one end the bevel gear 87 which meshes with the gear 85^a, and at the other end of the shaft 86 is fastened the bevel gear 89. A horizontal shaft 90 has one end journaled in the journal bracket 91 and has fastened thereto the bevel pinion 92 which meshes with the bevel gear 89.

The vertical shaft 53 has fastened to its lower end the bevel gear 95. A horizontal shaft 96 similar to 67 has fastened to one end the bevel gear 98 which meshes with the gear 95. The shaft 96 has fastened at its other end the bevel gear 99. A horizontal shaft 100 is journaled in the bearing of the bracket 73 and carries a bevel pinion 101 at one end thereof which meshes with the bevel gear 99.

The shaft 54 has fastened to its lower end the bevel gear 105. A horizontal shaft 106 similar to the shaft 67 has fastened to one end the bevel gear 107 which meshes with the bevel gear 105 and at its other end is

secured the bevel gear 108. A horizontal shaft 110 has one end journaled in a bearing of the bracket 85 and has fastened thereto the bevel pinion 111, which meshes with the bevel gear 108.

The shaft 55 has fastened to its lower end the bevel gear 113. A horizontal shaft 114 has fastened thereto the bevel gear 115 which meshes with the bevel gear 113. The shaft 114 has also attached thereto the bevel gear 116. A horizontal shaft 117 has one end journaled in a bearing of the bracket 91 and carries the bevel pinion 118 which meshes with the bevel gear 116.

The shaft 56 has fastened to its lower end the bevel gear 120. A horizontal shaft 121 similar to the shaft 67 has fastened to one end thereof the bevel gear 122 which meshes with the bevel gear 120. The shaft 121 has also fastened thereto the bevel gear 123. A horizontal shaft 124 is journaled in a bearing of the bracket 73 and has fastened at one end thereof the bevel pinion 125 which meshes with the bevel gear 123.

The vertical shaft 57 has fastened at its lower end the bevel gear 130. A horizontal shaft 131 similar to 67 has fastened at one end thereof the bevel gear 132 and to the other end the bevel gear 133. The bevel gear 132 meshes with the bevel gear 130. A horizontal shaft 134 has one end journaled in a bearing of the bracket 85 and carries the bevel pinion 135 which meshes with the bevel gear 133.

The vertical shaft 58 has fastened to its lower end the bevel gear 140. A horizontal shaft 141 has fastened thereto the bevel gears 142 and 143. The bevel gear 142 meshes with the bevel gear 140. A horizontal shaft 144 has one end journaled in a bearing of the bracket 91 and carries the bevel pinion 145 which meshes with the bevel gear 143.

The controller column is indicated in its entirety by the numeral 150 and comprises the lower supporting casing indicated in its entirety by the numeral 151, that carries the grooved casing 152 which will be subsequently explained in detail. Upon the casing 152 is supported the lower ring member 153 of a ball bearing cage. An upper member of the ball bearing cage is indicated at 154, which bears on the ball bearings 155 supported in the cage 153. Arms 158, 159, and 160 are formed with the member 154. The arm 158 has formed therewith the sector 162 with the journal bearings 163 and 164 at its ends. The arm 159 has formed therewith the sector 165 with the journal bearings 166 and 167 at its ends. The arm 160 has formed therewith the sector 170 with the journal bearings 171 and 172 at its ends. The journal bearings 163 and 167 support a pin which carries the sheave 175. The bearings 164 and 172 sup-

port a pin which carries the sheave 176. The bearings 166 and 171 support a pin for the sheave 177. The member 154 has also formed therewith pairs of bracket lugs 180 for the rollers 181, 182 and 183. The casing 151 is made of two members 184 and 185 which are fastened to each other by means of the screws 186 that clamp the flanges 187 and 188 that are formed with the members of said casing. The members 184 and 185 have respectively formed therewith the foot plate comprising the portions 190 and 191, and pairs of horizontal tables designated by the numerals 192 and 193, 194 and 195, 196 and 197, 198 and 199, 200 and 201, 202 and 203, 204 and 205, 206 and 207. The portion of the foot plate 190 and the tables 192, 194, 196, 198, 200, 202, 204, and 206, have formed therewith the journal brackets 210. The latter brackets have respectively journaled therein the shafts 144, 134, 124, 117, 110, 100, 90, 83 and 72. Each of the latter shafts have formed therewith a worm 212. Each of the worms have meshing therewith respectively from the bottom up, the worm wheels 215, 216, 217, 218, 219, 220, 221, 222, and 223.

Within the controller column are located a plurality of concentric pipes or tubes designated by the numerals 225, 226, 227, 228, 229, 230, 231, 232 and 233. The pipes have formed at their upper ends respectively the flanges 235, 236, 237, 238, 239, 240, 241, 242 and 243. The said flanges fit the inner cylindrical surface of the casing 152. The lower end of the pipe 225 is supported on the tables 206 and 207. The lower end of the pipe 226 is supported on the tables 204 and 205. The lower end of the pipe 227 is supported on the tables 202 and 203. The lower end of the pipe 228 is supported on the tables 200 and 201. The lower end of the pipe 229 is supported on the tables 198 and 199. The lower end of the pipe 230 is supported on the tables 196 and 197. The lower end of the pipe 231 is supported on the tables 194 and 195. The lower end of the pipe 232 is supported on the tables 192 and 193. The lower end of the pipe 233 is supported on the portions 190 and 191 of said foot plate. The portion 184 of the casing 151 has extended therefrom lugs 250 for the elongated roller 251. The portion 190 of the foot plate has extending therefrom a journal bracket 252 for the roller 253. Worm wheels 215 to 223 inclusive are secured to their accompanying pipes which they encircle by means of the screws 255.

The casing 152 has formed therein a main vertical guide groove 260 and at various levels corresponding to the number of turntables there is therein formed what I term a station of similar curves. Each station comprises essentially a pair of practically vertical grooves 261 and 262. The groove

261 has formed therewith the leg 263 which joins the groove 261 of the next below station. The groove 262 joints with the leg 264 which in turn is connected to the leg 265 by means of the practically horizontal connecting member 266. The groove 265 has the upper return bend 267 which connects with the leg 263. The top station is shown with the upper curved groove 270 that connects the groove 260 with the leg 264. An entering groove 271 extends from the upper portion of the casing 152 to the return bend 267 of the upper station. A return member 273 of the lowest station, connects the grooves 260 and 263 thereof.

On the pipe 225 are located a plurality of tripping blocks 275 corresponding to the number of turntables in the apparatus. Each of the blocks 275 is pivoted to said pipe 225 and extends through the leg 261 of the casing 152. The blocks 275 are pivoted to the pipe 225 by means of the pivot pins 278. A vertical connecting rod 280 is pivoted to each block at the end of the latter by means of the pivot pins 281. A swinging block 282 is pivoted to the pipe 225 by the pivot pin 283. The latter block enters an opening 284 in the casing 152. A link 285 has one end pivoted to the block 282. A bell crank with the arms 286 and 287 is pivoted to the casing 151 by means of the pivot pin 288. The arm 286 is pinned to the link 285, through an elongated hole 289^a by means of the pivot pin 289. A connecting rod 293 has one end pinned to the arm 287 of said bell crank, by means of the pivot pin 293^a. The other end of the rod 293 is pivoted to the arm 730.

The pipe 226 has formed therein a helical groove 300 which is engaged by the pin 301 extending from the table 206. The purpose of the groove is to raise the pipe slightly when turning as will be fully explained farther on. The pipe 226 has extending therefrom a plurality of rods 302 each of which carries a lifting block 303. The said lifting block extends into the connecting member 266 of each station of grooves of the casing 152. The pipe 225 has requisite openings to permit the rods 302 to swing with their pipe.

The pipe 227 has extending therefrom a plurality of rods 306, one for each station of grooves. Each of the rods 306 supports a triangular switch or directing block 307 which is located to move in direction of the leg 263, to stop off said leg. The pipes 225 and 226 have requisite openings to permit the rods 306 to swing with their pipe.

From the pipe 228 extends a rod 310 and the latter carries a triangular switch block 311 similar to 307, which is positioned to move into either the leg 261 or the lower end of the curved groove 270. The purpose of the switch block is to stop off either the leg 261

of the uppermost station or the curved groove 270. The pipes 225, 226, and 227 have requisite openings to permit the rod 310 to swing with its pipe.

5 From the pipe 229 extends a rod 315 with a switch block 316 similar to the rod and switch block just described and for a similar purpose for the second station of grooves from the top, except that it stops off the
10 groove 262 instead of a curved groove 270. The pipes 225, 226, 227, and 228 have requisite openings for the rod 315 to swing when performing its function.

From the pipe 230 extends a rod 318 with
15 a switch block 320 similar to the rod and switch block described on the pipe 228, and for a similar purpose for the third station of grooves, as described for the second station. The pipes 225, 226, 227, 228, and 229
20 have requisite openings for the rod 318 to swing when performing its function.

From the pipe 231 extends a rod 325 with a switch block 326 similar to the rod and switch block described on the pipe 228 and
25 for a similar purpose for the fourth station of grooves as described for the second station of grooves. The fourth station of grooves which is similar to the above stations is not shown in Fig. 1. The pipes 225,
30 226, 227, 228, 229 and 230 have requisite openings for the rod 325 to swing when performing its function.

From the pipe 232 extends a rod 330 with a switch block 331 similar to the rod and
35 switch block described on the pipe 228 and for a similar purpose for the fifth station of grooves as described for the second station of grooves. The fifth station of grooves which is similar to the above stations is not
40 shown in Fig. 1. The pipes 225, 226, 227, 228, 229, 230 and 231 have requisite openings for the rod 330 to swing when performing its function.

From the pipe 233 extends a rod 333 with a switch block 334 similar to the rod and switch block described on the pipe 228 and
45 for a similar purpose for the last station of grooves as for the second station of grooves. The pipes 225, 226, 227, 228, 229, 230, 231, and 232 have requisite openings for the rod
50 333 to swing when performing its function.

A collar 350 is slidably located on the casing 152. From the inner surface of said collar extends a journal pin 351. On the said
55 pin is journaled a wheel cage indicated in its entirety by the numeral 352. The said wheel cage 352 has journaled therein the three rollers 353, 354, and 355, adapted to travel in the groove 264 and other grooves
60 of the casing 152. The collar 350 is provided with a counterweight 357. To the said collar 350 is fastened a tone arm 360. On the upper circumferential edge of the collar 350 is located a ball bearing cage 361
65 with the ball bearings 362 and on the lower

circumferential edge of the said collar is located the ball bearing cage 363 with the ball bearings 364.

To said tone arm 360 and at right angles thereto is fastened a bracket 363^a which has
70 formed therewith the bearing 364^a. An enlarged cylindrical end 368 is formed with the arm 366 and is supported in the bearing 364^a. A disk 365 is formed with the cylindrical end 368. The arm 366 is secured in
75 the bearing 364^a by means of the retaining disk 371 and the screw 373. A stop lug 374 is formed with the cylindrical end 368 which coacts with the stop edge 375 of the bracket
80 363^a to limit the swing of the arm 366 in a vertical plane. To the outer end of the arm 366 is journaled a roller 370. An adjusting screw 378 is in threaded engagement with the arm 366.

A bracket 380 similar to 363^a is attached
85 to the tone arm 360. The latter bracket is inclined to the longitudinal axis of the tone arm 360. An arm 382 similar to 366 is supported in the bracket 380. A roller 383 similar
90 to the roller 370 is journaled in the arm 382. An adjusting screw 385 similar to 378 is in threaded engagement with the arm 382.

A horn 386 extends from the tone arm 360 and is in acoustic communication with the interior thereof. A filler plug 388 is inserted
95 in the large end of the arm 360. A counterweight 389 extends from the tone arm 360 at the side opposite to the horn 386 to counterbalance the latter.

The tone arm 360 has an extension 390
100 hinged thereto with the concaved end 393, (Fig. 38) which registers with the convex end 394 of the tone arm 360. The ends 393 and 394 form a joint to prevent diffusion of sound when the extension 390
105 swings on its joint.

An arm 395 is fastened to the extension 390 by means of the screws 396 (Fig. 36). The arm 395 has extending from its outer
110 end the pin 397 on which is pivoted the sleeve 398. A stop bar 399 extends from the sleeve 398 and is in the path of the stop pins 400 extending from the arm 395. A pivot pin 401 extends from the sleeve 398 and has
115 journaled thereon the roller 405. A bracket 406 is attached to the tone arm 360 and has extending therefrom the pivot 407 and to the latter is journaled the roller 408. A reproducer 410 is located at the end of the extension 390 and has the reproducing point
120 412.

A casing indicated in its entirety by the numeral 425 having the front wall 426 and the side wall 427 is shown in the main casing 20. The door 26 of the main casing 20
125 allows entrance into the casing 425. A plurality of shelves 430 and 431 are provided for the casing 425. The chamber 440 below the shelf 431 contains the driving mechanism for the apparatus. In the chamber 130

440 is shown the motor 442 with the armature shaft 443 on which is fastened the driving pinion 444. A shaft 445 is journaled in the journal brackets 446, 447, 448 and 449.

5 The said journal brackets are fastened to the floor 24 of the main casing 20. The shaft 445 has fastened near one end the driving gear 450 which meshes with the pinion 444. At the other end of the shaft 445 is fastened the brake wheel 453 with the brake strap 454 with the upper member 455. A lug 456 extends from the bracket 449 and has pinned thereto, one end of the brake strap 454. The lug 456 has in threaded engagement the threaded end 458 of the rod 459, the latter having formed therewith the flange collar 460. The threaded end 458 of the rod 459 extends through the upper member 455 of the strap 454. The flange collar 460 bears upon said member 455 of the strap. The rod 459 extends through the roof 42 of the casing 40 and has connected thereto an operating handle and pointer 403. A bevel gear 465 is fastened to the shaft 445. A sprocket chain wheel 462 is fastened to the shaft 445 between the journal brackets 447 and 448. A pair of journal brackets 468 and 469 and the journal brackets 470 are supported upon the floor 24 of the casing 20, and a journal bracket 471 is supported upon the floor 23 of the casing 20. A diagonal shaft comprising the portions 472 and 473 is joined by the coupling 475 and is journaled in the brackets 468, 469, 470 and 471.

35 A bevel gear 476 at one end of the portion 472 meshes with the bevel gear 465. Between the journal brackets 468 and 469 there is fastened to the member of the diagonal shaft 472, a sprocket chain wheel 478 similar to 462. The portion 472 of the diagonal shaft has fastened at one end thereof the bevel gear 479.

To the rear wall 33 of the casing 20 there is secured near the upper portion thereof a journal bracket 490 and at the lower portion thereof a journal bracket 491. A plurality of intermediate brackets 492 are also secured to said wall 33. A vertical driving shaft 495 is journaled in said brackets secured to the wall 33. A bevel gear 496 at the lower end of the shaft 495 meshes with the bevel gear 479. A plurality of guide planks each designated by the numeral 498 extend between the walls 31 and 33 of the casing 20. One guide plank is provided for each station of grooves of the casing 152. A plurality of journal brackets 500 are secured to the wall 33 and each one thereof has formed therewith a journal pocket 501 with the lower opening 502 that encircles the shaft 495. A supporting arm 504 has formed therewith the upper table 505, with the ball bearing races 506, 507, and 508. A bearing sleeve 510 extends from the table 505 and is supported in the bearing

pocket 501. A rib 512 connects the table 505 and the bearing sleeve 510. A journal pin 515 extends from the table 505 and has journaled thereon the spur gear 520. A ball bearing race 521 is formed with the gear 520. Ball bearings 522 are provided for the ball bearing races 506 and 521. A pinion 525 is fastened to the shaft 495 and meshes with the spur gear 520. A disk 526 is fastened to the pinion 525 and has formed therein the ball bearing race 527. Ball bearings 528 are provided for the ball bearing races 508 and 527. A journal pin 530 extends from the table 505 and has journaled thereon the pinion 531 which meshes with the spur gear 520. A disk 535 is provided for the pinion 531 and has formed therewith the ball bearing race 536. Ball bearings 537 are provided for the ball bearing races 507 and 536.

For each station of grooves on the casing 152 is provided a turntable 540 having the boss 541, the flange 542 and the cavity 543. Screws 544 connect the disk 535, pinion 531 and boss 541 together. To the rib 512 is pivoted the reach arm with the members 546 and 547. The member 547 of the reach arm is contracted at its outer end 548 and has formed therewith the shoulder 549. A handle 550 extends from said end 548. The end 548 is normally locked in an opening 552 (Fig. 34) of the guide plank 498. A spring 554 extends from the plank 498 and bears against the edge of the member 547 of said reach arm to lock it in position. By moving the handle 550 in direction of the arrow "A" the reach arm can be unlocked and pulled through the opening 552. By virtue of the member 546 of reach arm, the latter can be moved through a longer distance than if the member 547 were directly pivoted to the rim 512.

In the axial center of the turntable 540 and supported in the boss 541 formed therewith is located a spindle 560 with the threaded portion 561 and the longitudinal slots 562. A talking machine record 563 having the spiral groove 564 is located on turntable 540. A plate 565 bears on the said record 563. A bifurcated bracket 568 extends from the plate 565. The plate 565 has the hole 566 with the projections 567 which fit in the slots 562 of the spindle 560. A screw 572 encircles the spindle 560 and bears upon the plate 565 and has formed at its lower end the circular V shaped guide 575 that engages a similar guide on the plate 570. A pair of guide pins 576 connect the plates 565 and 570. An operating disk 577 with the handle 578 encircles the top end of the spindle 560 and bears upon the screw 572 to which it is pinned. The lifting cone is secured in operative position by means of the wing nut 579. The said lifting cone is indicated in its entirety by the numeral 585 and

is threaded for the screw 572. A pair of guide openings 586 are formed in said cone for the guide pins 576. A guide opening 588 parallel to the outer surface of the cone, slidably supports an index finger 590. A link 592 has one end pinned to the index finger 590. A link 593 has one end pinned to the bracket 568 and the links 592, 593 are pinned to each other by means of the pins 595. A spiral groove 597 adapted to carry the roller 405 is formed on the surface of the cone 585 and leads inwardly from the bottom to the top thereof.

The flange 542 of the turntable has secured thereto by means of the screws 598, the guide ring 600. An internally threaded sleeve 601 has an annular groove that is engaged by the ring 600. A bracket 604 with the handle 605 extends from the sleeve 601. A lowering ring 606 has formed on its inner inclined surface the spiral groove 607 adapted to carry the roller 408 and leads inwardly from the top to the bottom thereof. On the outer surface of the ring 606 there is secured a threaded sleeve 608 which is in threaded engagement with the internally threaded sleeve 601. The ring has formed therein the guide cavity 610 for a plunger 611 and the latter has extending therefrom the guide finger 612. In the cavity 543 of the turntable 540 there is pinned by means of the pin 615 a bell crank having the arms 616 and 617. The arm 616 has formed at its upper end an elongated opening 618 which engages a pin 619 contained in a slot 620 in the plunger 611. A link 623 has one end pinned to the arm 617 and the other end is pinned to the ring 606 by means of the pin 624. A slot 630 to enable the arm 616 to swing is formed in the ring 606 and a plate 631 with the slot 632 is secured to the bottom face of the ring 606. The arm 616 moves in the slot 632. Guide pins 635 extend from the turntable 540 through the ring 606. Wing nuts 636 are provided for the top of the pins 635 to clamp the ring 606 in operative position.

From the roof of the casing 20 are suspended a pair of journal brackets 640 in which is journaled the shaft 642 that has attached thereto the sprocket wheel 643. A sprocket chain 644 with the links 645 and 646 engage the teeth of the sprocket wheels 462 and 643. The links 646 have formed there- with the elevating fingers 650 and project- ing lugs 651 and guide pins 652 which extend through the finger 650. Guide bars with the vertical members 655 have hori- zontal members 656 and 657 by means of which they are secured to the wall 25 of the casing 20. The vertical members 655 are positioned so that the pins 652 bear on the edge thereof and the lugs 651 on the opposite edge. The elevating fingers 650 are posi- tioned to come in contact with the roller 370

when the arm 360 is located in a direction parallel to the wall 25 of the casing 20.

Journal brackets 660 similar to 640 extend from the roof 22 of the main casing 20. The latter brackets support a shaft 662 that carries a sprocket chain wheel 665 similar to 643. Guide bars with vertical members 655 and horizontal members 656 and 657 are fastened to the wall 34 of the casing 20. A sprocket chain indicated in its entirety by the numeral 667 carries the elevating fingers 650. The said sprocket chain 667 is engaged by the sprocket chain wheels 478 and 663. The elevating fingers 650 are positioned to engage the roller 383 of the tone arm 360.

Eyelets 675 and 676 extend from the collar 350 and an eyelet 677 extends from the tone arm 360. These eyelets are equally distant from each other on a radius line from the center of the wheel 354 which is also the center of balance of the arm 360 and its appurtenances. A chain 680 is fastened at one end thereof to the eyelet 675. A chain 681 has one end fastened to the eyelet 676. A chain 682 has one end fastened to the eyelet 677. The chain 680 bears on the roller 183 and the sheave 176 from whence it enters the pipe 233 and is attached to the counterweight 685. The chain 681 bears on the roller 181 and the sheave 175 from whence it enters the pipe 233 and is attached to said counterweight 685. The chain 682 bears on the roller 182 and the sheave 177 from which it enters the pipe 233 and is fastened to the counterweight 685. To each of the screws 378 and 385 respectively of the arms 366 and 382 is fastened a swivel 690. A threaded link 691 with spherical ends 692 and 693 is supported by the swivel 690. A ring 694 is suspended from the link 691. From the rings 694 extend the chains 700 and 701 which both bear under the elongated roller 251 and from thence extend under the roller 253 and are finally connected to the counterweight 685.

A shaft is indicated with the portions 705 and 706 connected by the coupling 707. Journal brackets 708 and 709 extend from the floor 23 of the casing 20 and support said shaft. A journal bearing 710 is fastened to the plank 703 and one end of the portion 706 is journaled therein. The portion 706 has fastened thereto the latch arm 712 which extends into the cavity 704. From the door 28 of the casing 20 extends the latch plunger 713 having a slot 714. Between the walls 30 and 33 of the casing 20 extends the lower connecting plank 703 with the cavity 704. The slot 714 can engage the latch arm 712. A plunger casing 718 with the rear wall 719 is attached to the cross plank 703 and has formed in its wall the guide slot 720. A latch plunger 721 with the guide pin 722 is contained in the casing 718. The pin 722 extends into the slot 720. A spring 725 bears

between the plunger 721 and the end wall 719 of the casing 718. An arm 730 with the counterweight 731 secured to the end thereof, extends from the portion 706 of the shaft just described to which it is fastened. A switch 735 has a blade 736 which is connected at one end of the shaft 705. A wire 740 extends from the switch 735 to the motor 442. A lead wire 742 also extends from said motor. A lead wire 743 extends to the blade 736.

The invention operates as follows: To prepare the apparatus for reproducing, each of the wing nuts 579 is removed and the spiral grooved lifting cone 585 with its apertures is lifted from the spindle 560. Selected disk records 563 are then placed on each of the turntables 540. The spiral cones 585 are then replaced on the spindles 560 and the handle 578 is then turned and the screw 572 turning therewith raises or lowers the spiral grooved lifting cone 585. The amount of turning of said handle is determined by the index finger 590. When this index finger is directly over the end of the record groove 564 the spiral grooved lifting cone 585 is in proper position for the operation of the apparatus. The wing nuts 579 are then screwed in position. The index finger 590 by means of its link connections moves horizontally in proportion to the vertical motion of the spiral grooved cone 585. By means of the foregoing, the correct height of the spiral grooved cone 585 is determined for the various diameters of record grooves employed. The next operation is to determine the correct height of the ring 606 and to make the adjustment thereof. The function of the groove 607 of the ring 606 is to guide the roller 408 of the tone arm 360. This is accomplished as follows: Wing nuts 636 are unscrewed but not removed and the handle 605 with its sleeve 601 is turned. This raises or lowers the ring 606. The correct position of this ring is determined by the index finger 612 which moves horizontally through the intervention of its link connections in a manner similar to the movements of the index finger 590. The vertical adjustment of the ring 606 is made until the end of the index finger 612 is over the beginning of the record groove 564. The wing nuts 636 are then screwed tight to lock said adjustment. The reproducer point 412 will then drop into the beginning of the record groove 564 of the record 563. The door 28 of the cabinet is then closed. The latch 713 on said door pushes back the latch plunger 721 out of the path of the latch arm 712 and thereby permits the latch arm 712 to enter into the slot 714 when the shaft 706 is turned. It will be noted that when the door 28 is open, the plunger 721 is in path of the latch arm 712 and prevents it from moving upward. The purpose of the

arrangement just described is to prevent entrance into the cabinet when the mechanism thereof is operating. The counterweight 731 on the shaft 706 normally tends to hold the latch plunger 712 in its locked position. When said latch arm is in a locked position the switch 736 is closed and the motor circuit for the motor 442 is closed. The motor 442 is now ready to operate and may be started by shifting the tripping blocks 275 from under the rollers 353, 354 and 355 thereby releasing said wheels in the groove 261 and permitting same to descend. This is accomplished by turning the handle 62 of the controller shaft 50. The release of said rollers 353, 354 and 355 from the tripping blocks 275 permits the said tripping blocks to ascend and resume their horizontal position due to the balancing effect of the weight 731 which at the same operation turns the shaft 705 and closes the motor circuit. The speed of rotation of the apparatus is regulated by varying the pressure of the brake strap 454 on the brake wheel 453. The variations of pressure of the brake strap is accomplished by turning the operating handle 403. The rotations of the armature of the motor 442 actuates the shafts 472 and 445 by means of the gears already described and rotates the sprocket chain wheels 462 and 478. The fingers 668 when traveling upwardly engage the roller 383, and thereby the rollers 353, 354 and 355 of the collar 350 move upwardly in the groove 265, until they enter the portion 267, and immediately thereafter the collar 350 with its tone arm descends by gravity.

If it is desired to repeat a record the triangular directing block 307 is moved into the leg 267 by means of the operating handle 62 which operates the shaft 52 of the controller cabinet. The wheels 253, 254 and 255 travel down the leg 267 until they strike the switch block 307 and are redirected into the groove 264 thereby causing the roller 408 to drop in the groove 607 of the ring 606 and descend until the reproducer point becomes engaged with record groove and the record is repeated. If however it is desired to play a record on a lower turntable, the triangular switch block 307 is moved into its original position in the leg 265 and the wheels are then allowed to enter the groove 261 and descend to the next below turntable. If it is desired to omit a certain record any of the directing blocks 311, 316, 320, 326, 331 and 334 are moved respectively by their controller shafts 53, 54, 55, 56, 57, or 58 by the handle 62, so as to block the wheels 253, 254 and 255 from entering the groove 262 and directing them to enter the groove 261. In case it is desired to lift the reproducer 410 from the record at any time during the operation of the apparatus, to change the needle 412 or to discontinue the

playing of a certain record, the pin 301 in the helical groove 300 lifts the pipe 226 with its attached lifting blocks 303 which engage the rollers 353, 354 and 355 and raises the tone arm and reproducer 410 and its appurtenances and moves them across the record so that the roller 405 becomes engaged in the groove 597 of the lifting cone 585. When it is desired to stop the operation of the apparatus the controller shaft 50 is turned by means of the handle 62 which turns the pipe 225 and sets the tripping blocks 275 in the path of the descending wheels 353, 354 and 355. When the said wheels strike the tripping block 275, their weight counteracts the weight 731 and causes the shaft 705 to turn and opens the motor circuit. When the apparatus has come to a stop the reproducer 410 is positioned in front of the door 31. This is arranged for the purpose of changing the needle 412. When the door 33^a is opened the couplings 475 and 707 may be easily detached from their respective shafts, and then the operator may release the hooks 36 to separate the portions as 29 and 30 of the casing 20 and the parts connected thereto.

Having described my invention what I desire to secure by Letters Patent and claim is:

1. In an apparatus of the character described the combination of a casing with a door, a plurality of turntables with records located in said casing, means to reproduce any of said records and automatic means to lock the door of the casing when the turntables are rotating.
2. In an apparatus of the character described the combination of a plurality of turntables supporting disk records, a reproducer for the records, an elevating cone and a lowering ring for each record to respectively elevate and lower said reproducer means to actuate the turntables and means to automatically move the reproducer from one turntable to the other.
3. In an apparatus of the character described the combination of a plurality of turntables each supporting a disk record, an elevating cone and a lowering ring for each turntable respectively to elevate and lower the said reproducer, means to rotate the turntables and means to automatically locate the reproducer on any of the said records and thereby reproduce the same.
4. In an apparatus of the character described the combination of a plurality of turntables supporting disk records, an elevating cone and a lowering ring for each turntable to respectively elevate and lower the said reproducer, means to rotate the turntables, a controller column for the reproducer and means connected to said controller column to automatically locate the reproducer on any of said records and reproduce the same.
5. In an apparatus of the character described the combination of a plurality of turntables supporting disk records, an elevating cone and a lowering ring for each turntable to respectively elevate and lower the said reproducer, a controller column, a casing on the controller column, a plurality of grooves in said casing and means located in the grooves coacting with the reproducer to automatically locate the reproducer on any of said records to reproduce the same.
6. In an apparatus of the character described the combination of a plurality of turntables each supporting a disk record, a reproducer for the said records, a tone arm for the reproducer, a controller column in the apparatus, a collar for the reproducer supported on said controller column and means connected to the controller column to direct the collar with its reproducer so as to reproduce any of said records desired.
7. In an apparatus of the character described the combination of a plurality of turntables each supporting a disk record, a reproducer for said records, a tone arm connected to said reproducer and having a collar, a plurality of pipes in the apparatus, the said collar encircling said pipes and means connected to the said pipes to reproduce the said records in continuous succession or in selected succession.
8. In an apparatus of the character described the combination of a plurality of turntables each supporting a disk record, a reproducer for said records, a tone arm having a collar connected to said reproducer, a plurality of pipes in the apparatus, a casing with grooves for the pipes, the collar of the tone arm encircling said casing, a roller cage with rollers pivoted to the collar and traveling in the grooves of the casing to direct the collar with its appurtenances from one record to another and thereby reproduce the same.
9. In an apparatus of the character described the combination, of a plurality of turntables supporting disk records, a reproducer for said records, an extension for said reproducer, a tone arm hinged to said extension, a horn connected with said tone arm, a collar for the tone arm, a roller cage for the collar, rollers journaled in the roller cage, means to locate the reproducer on any of said records and means to rotate the turntables.
10. In an apparatus of the character described the combination, of a plurality of turntables supporting disk records, a reproducer for said records, an extension for said reproducer, a tone arm hinged to said extension, a horn for the tone arm, a pair of brackets secured to the tone arm, arms hinged to said brackets, rollers journaled to the latter arms, a collar for said tone arm, a roller bearing cage secured to the lower

edge of the said collar, a roller bearing cage secured to the upper edge of the said collar, ball bearings for the said cages, means to locate the reproducer on any of said records and means to rotate the turntables.

11. In an apparatus of the character described the combination, of a plurality of turntables supporting disk records, a plurality of concentric pipes in the apparatus, a plurality of tripping blocks pivoted to one of the pipes, a rod connecting the ends of the tripping blocks, a swinging block pivoted to the lower end of the rod, a bell crank pivoted in the apparatus, a link with one end pinned to one end of said swinging block and its other end pinned to an arm of said bell crank, a shaft supported in the apparatus, a counterweight arm on the shaft, a rod connecting the latter arm and the other arm of the bell crank, a switch operated by said shaft, means to rotate the turntables which is controlled by said switch, means to locate a reproducer on any of said records and thereby reproduce the latter and means to automatically stop the rotations of the turn tables.

12. In an apparatus of the character described the combination, of a plurality of turntables supporting disk records, a reproducer for the records, an extension for the reproducer, a pivot for the extension, a roller journaled on the pivot, a bracket secured to the extension, a pivot for the bracket, a roller journaled on the latter pivot, a tone arm hinged to the extension, means to rotate the turntables and means to locate the reproducer on any of said records to reproduce the latter.

13. In an apparatus of the character described the combination, of a plurality of turntables supporting disk records, a reproducer for the records, an extension for said reproducer, a pivot for the extension, a roller journaled on the pivot, a bracket secured to the extension having a pair of stop lugs, a pin extending from the bracket, a sleeve having a stop lug journaled on the pin, the stop lugs on the bracket coacting with the stop lug on the sleeve, means to rotate the turntables and means to locate the reproducer on any of said records to reproduce the latter.

14. In an apparatus of the character described the combination, of a plurality of turntables supporting disk records, a reproducer for the records, a tone arm for the reproducer, rollers for the tone arm, a pair of sprocket chain wheels in the apparatus, elevating fingers for the said chains adapted to engage the said rollers and raise the latter, means actuating said sprocket chains and means to locate the reproducer on any of said records and means to rotate the turntables.

15. In an apparatus of the character de-

scribed, the combination of a controller column comprising a plurality of concentric pipes, a plurality of pivots extending from the outermost of said pipes, tripping blocks pivoted on said pivots, a rod connecting said blocks, a swinging block with one end pivoted to said outermost pipe and also to the lower end of said rod, an electric motor in the apparatus, connections between the motor and said swinging block, a grooved casing surrounding said pipes, a controller in the apparatus, connections between the said controller and said outermost pipe to move the latter and means coacting with the tripping blocks to control the operations of said motor.

16. In an apparatus of the character described, the combination of a controller column comprising a plurality of concentric pipes, a casing with grooves surrounding said pipes, a helical groove in one of said pipes, a stationary pin in said controller column engaging said groove, a controller in the apparatus, connections between the controller and the pipe having said groove to turn said pipe, a plurality of rods extending from the said pipe, a lifting block supported on the end of each of said rods and extending into the grooves of said casing, a collar encircling said casing, a tone arm with a reproducer for said collar, rollers for said collar extending into the grooves of said casing and coacting with said lifting blocks, the said lifting blocks vertically moving when the said pipe is turned and thereby vertically moving the tone arm and its reproducer.

17. In an apparatus of the character described the combination of a controller column comprising a plurality of concentric pipes, a grooved casing surrounding said pipes, a rod extending from each of a number of said pipes, a switch block supported at the end of each of said rods and located at the junction of a pair of said grooves, and means to turn said pipes to stop off either of said grooves.

18. In an apparatus of the character described the combination of a controller column, a plurality of concentric pipes in said column, a worm wheel for the lower end of each of said pipes, a worm meshing with each worm wheel, a controller adjacent to said controller column, controller shafts in said controller one shaft for each of the pipes of the column, connections between each one of said shafts and one of said worms, an arm at the upper end of each shaft, a standard extending from each arm to swing the latter and thereby turn said controller shaft by virtue of which the pipes in the controller column are turned.

19. In an apparatus of the character described the combination of a controller column, comprising a plurality of concentric

pipes, a grooved casing surrounding said pipes, a collar surrounding said casing adapted to slide vertically thereon, a tone arm connected to the collar, a plurality of turntables each supporting disk records, a reproducer for the tone arm engaging said records, a counterweight in the controller column, connections between said collar and the counterweight to partially counterbalance the collar and its appurtenances, means to rotate the turntables and thereby reproduce the records.

20. In an apparatus of the character described, the combination of a casing with detachable portions, a plurality of turntables for records located in said casing, an elevating cone and a lowering ring for each of said turntables and means to reproduce any of said records.

21. In an apparatus of the character described, the combination of a plurality of turntables supporting disk records, a reproducer having a reproducing point for the

records, a lowering ring for each of the turntables having an indicating needle with link connections to secure its correct adjustment to automatically lower said reproducer so that the reproducing point will start at the beginning of the musical groove of the record, an elevating cone for each of the turntables having an indicating needle with link connections to determine its correct adjustment to automatically raise the reproducer at the end of the musical groove of the record, means to rotate the turntables and means to automatically locate the reproducer on any of said records and thereby reproduce the same.

Signed at the borough of Manhattan in the county of New York and State of New York this 29th day of May, A. D. 1916.

LUCIEN M. FLAGG.

Witnesses:

AELAI BONNWILER,
RALPH E. SLAYTON.

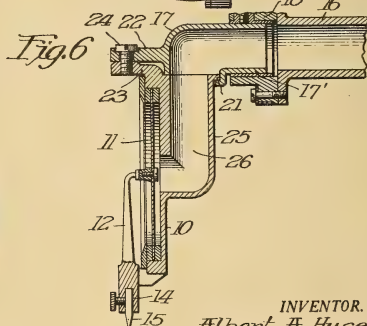
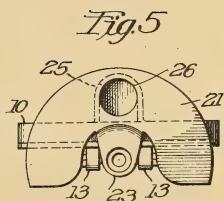
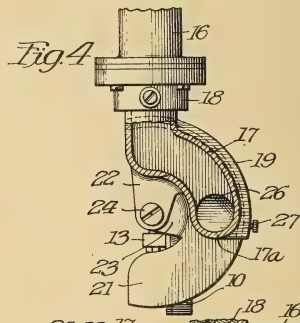
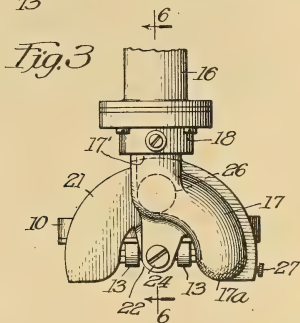
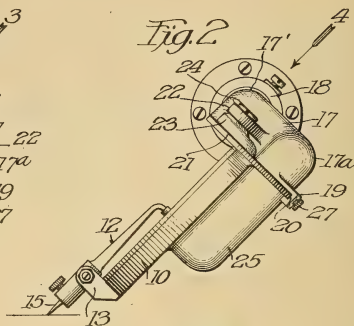
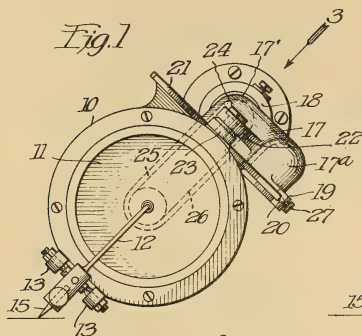
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

REPRODUCER FOR TALKING-MACHINES,
#1,236,942-----Albert A. Huseby,
Patented-August 14th, 1917.
Filed-April 6th, 1917.

A. A. HUSEBY.
 REPRODUCER FOR TALKING MACHINES.
 APPLICATION FILED APR. 6, 1917.

1,236,942.

Patented Aug. 14, 1917.



WITNESS

Leonard W. Novander.

INVENTOR.

Albert A. Huseby

By Tond & Wilson
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

REPRODUCER FOR TALKING-MACHINES.

1,236,942.

Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed April 6, 1917. Serial No. 160,149.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reproducers for Talking-Machines, of which the following is a specification.

This invention relates to improvements in reproducers for talking machines, and has reference more particularly to that type of reproducers commonly known as universal reproducers or sound boxes, which are adapted to play records of both of the well known vertically and laterally undulating types. Some sound boxes of this character employ two separate needles or styluses for playing the two kinds of records, respectively, while others employ but a single needle or stylus the position of which, however, is changed when changing from one record to the other. Lately attempts have been made to provide a sound box employing but a single needle and wherein the needle undergoes no relative change in position when the sound box itself is turned through an angle of ninety degrees in adapting it to play the other type of record. The purpose of the present invention is to provide an improved sound box of the last mentioned type, wherein the sound box is pivoted to the tone arm on an axis that coincides with the axis of the stylus socket, so that the stylus undergoes no change of either angular or relative position when the sound box itself is turned from one playing position to the other.

My invention, its mode of operation, and the advantages resulting therefrom will all be readily understood by those familiar with this art from a consideration of the following description taken in connection with the accompanying drawing wherein I have illustrated a practical and approved embodiment of the invention, and in which—

Figure 1 is a front elevation showing a sound box in position suitable for playing a record of the laterally undulating type;

Fig. 2 is a similar view showing the sound box turned through an angle of 90° and in position for playing a record of the vertically undulating type;

Fig. 3 is a top view of the sound box shown in Fig. 1, viewed in the direction of arrow 3;

Fig. 4 is a similar view, partly in hori-

zontal section, of the sound box shown in Fig. 2, viewed in the direction of the arrow 4;

Fig. 5 is a top plan view of the sound box detached from the tone arm extension;

Fig. 6 is an axial section on the line 6—6 of Fig. 3.

Referring to the drawings, 10 designates the body of the sound box which is equipped with the usual diaphragm 11 and stylus lever 12 pivoted between lugs 13 and formed with a stylus socket 14 at its lower end adapted to contain the stylus 15. 16 designates the free end portion of the usual tone arm, and 17 designates a quadrant-shaped extension of the tone arm, the shank 17' of said extension being preferably flexibly connected by a rubber coupling member 18 to the end of the tone arm proper, as clearly shown in Fig. 6. The quadrant-shaped extension 17 is open on its lower side, and the outer side thereof is formed adjacent to its lower edge with a downwardly and inwardly turned flange 19 that provides a guide-groove 20. This guide-groove is engaged by the outer edge of a substantially semi-circular segment plate 21 that is rigid with the top of the sound box, said segment plate forming a closure for the lower side of the tone arm extension 17, which latter it may here be noted is closed at its outer end as shown at 17^a in Fig. 4. On the inner side of the extension 17 is a pivot lug 22, and on the upper end of the sound box is a forwardly projecting pivot lug 23 underlying the lug 22. These lugs are pivotally connected by a screw or pin 24, the axis of which is coincident with the axis of the stylus socket 14, as a consequence of which, when the sound box is shifted from the position shown in Fig. 1 to that shown in Fig. 2, or vice versa, the absolute position of the stylus 15 remains the same.

On the rear of the sound box is formed a tubular sound conductor 25 that affords a sound passage 26, the lower end of which communicates centrally with the space behind the diaphragm, while its upper end opens through the segment plate 21 and communicates freely with the tone arm extension 17 in all positions of the sound box, as will be evident by reference to Figs. 3 and 4.

From the foregoing it will be apparent that all that is necessary to adapt the sound box for the playing of a different record is

to shift it between the positions shown in Figs. 1 and 2, it being unnecessary to either supply a different needle (unless the needle is worn out) or to shift the position of the needle relatively to the record or the sound box. The segment plate 21 not only forms a closure for the lower side of the quadrant extension 17 but, through engagement with the guide-groove of the latter, it relieves strain on the pivot pin 24 and insures the accurate axial alinement of said pivot pin with the stylus socket and stylus. The friction of the segment plate in its guide-groove will ordinarily suffice to maintain the sound box in either of the two playing positions; but if desired, this may be insured by means of a set screw 27 passing through the flange 19 and engaging the edge of the segment plate 21.

It is believed that the novel structural features, and principle of operation of my improved reproducer will be apparent to persons skilled in the art from the foregoing description and accompanying illustration; and hence, without limiting myself to the precise details of structure and relative arrangement shown and described,

I claim:

1. In a universal reproducer for talking machines, the combination with a tone arm provided with a quadrant-shaped extension open on its lower side and closed at its free end, of a sound-box pivotally connected to said tone arm extension externally of the sound passage of the latter and on an axis coinciding with the axis of the stylus socket, said sound-box having at its upper end a substantially semi-circular segment plate concentric with the pivot axis of the sound-box slidably engaging and covering the open lower side of said extension and also formed with a sound passage extending through said plate and communicating with said tone arm extension in all positions of the sound-box.

2. In a universal reproducer for talking machines, the combination with a tone arm provided with a quadrant-shaped extension open on its lower side and closed at its free end, said extension having a lug projecting from one side thereof, of a sound-box having at its upper end a lug underlying the lug of said tone arm extension, a pivot screw connecting said lugs on an axis coincident with

the axis of the stylus socket of the sound-box, a substantially semi-circular segment plate concentric with said pivot screw slidably engaging and covering the open lower side of said extension, and a sound conductor on the rear side of said sound-box extending through said plate and communicating with said tone arm extension in all positions of the sound-box.

3. In a universal reproducer for talking machines, the combination with a tone arm provided with a quadrant-shaped extension open on its lower side and closed at its free end, and further formed with an internal guide groove adjacent to the lower edge of one side thereof, of a sound-box pivotally connected to said tone-arm extension externally of the sound passage of the latter and on an axis coinciding with the axis of the stylus socket, said sound-box having at its upper end a substantially semi-circular segment plate concentric with the pivot axis of the sound-box slidably engaging and covering the open lower side of said extension and with one of its edges engaging the guide-groove of the latter, and said sound-box being further provided with a sound passage extending through said plate and communicating with said tone-arm extension in all positions of the sound-box.

4. In a universal reproducer for talking machines, the combination with a tone-arm provided with a quadrant-shaped extension open on its lower side and closed at its free end, said extension having a lug projecting from one side thereof, and formed with an internal groove adjacent to the lower edge of the other side thereof, of a sound-box having at its upper end a lug underlying the lug of said tone arm extension, a pivot screw connecting said lugs on an axis coincident with the axis of the stylus socket of the sound-box, a substantially semi-circular segment plate concentric with said pivot screw slidably engaging and covering the open lower side of said extension and with one of its edges engaging the guide-groove of the latter, and a sound conductor on the rear side of said sound-box extending through said plate and communicating with said tone-arm extension in all positions of the sound-box.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

METHOD OF SOUND PRODUCTION,

#1,236,969-----F.S.Muckey,

Patented-August 14th, 1917.

Filed-May 5th, 1914.

Renewed-November 11th, 1916.

F. S. MUCKEY.
METHOD OF SOUND PRODUCTION.

APPLICATION FILED MAY 5, 1914. RENEWED NOV. 11, 1916.

1,236,969.

Patented Aug. 14, 1917.

2 SHEETS—SHEET 1.

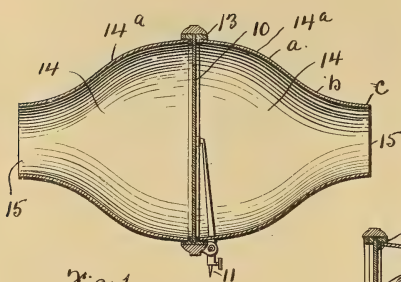


Fig. 1.

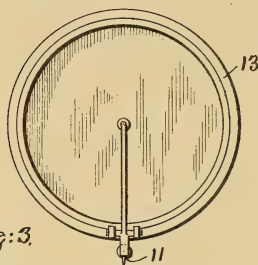


Fig. 3.

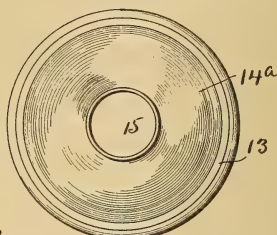


Fig. 2.

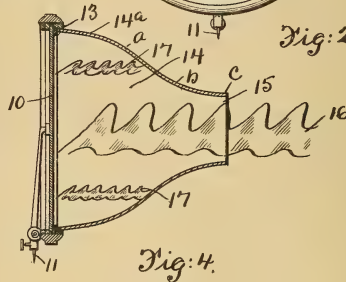


Fig. 4.

| | | | | | |
|---|---|----|-----|----------|------------------------|
| E | 7 | 10 | 9th | overtone | very inharmonic |
| D | 4 | 9 | 8th | " | very inharmonic |
| C | 4 | 8 | 7th | " | harmonic |
| B | 3 | 7 | 6th | " | slightly inharmonic |
| G | 3 | 6 | 5th | " | next harmonic |
| E | 3 | 5 | 4th | " | next harmonic |
| C | 3 | 4 | 3rd | " | next harmonic |
| G | 2 | 3 | 2nd | " | next most harmonic |
| C | 2 | 2 | 1st | " | most harmonic interval |
| C | 1 | 1 | | | Fundamental Tone |

Witnesses:
Arthur L. Adams
M. G. Edmiston

Fig. 5. Floyd S. Muckey, Inventor.
By his Attorney,
W. C. Hutchinson.

F. S. MUCKEY.

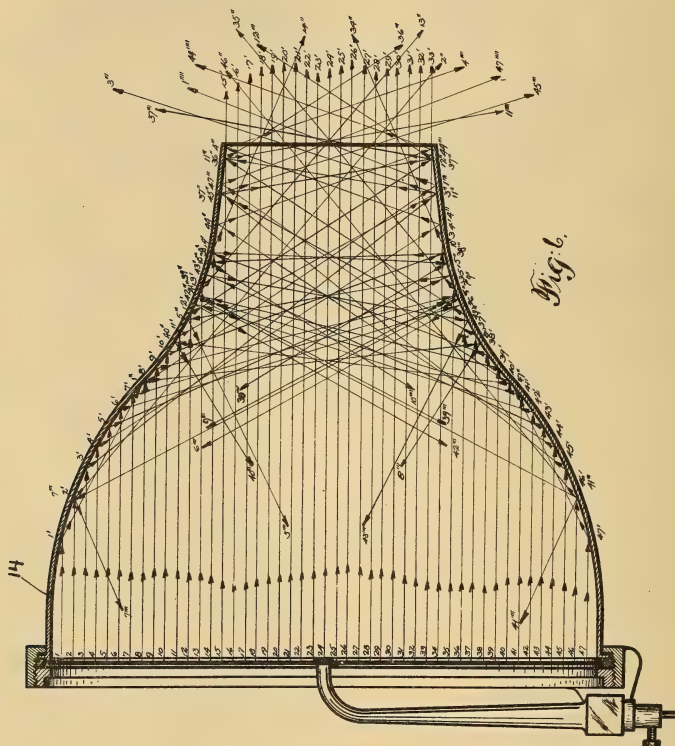
METHOD OF SOUND PRODUCTION.

APPLICATION FILED MAY 5, 1914. RENEWED NOV. 11, 1916.

1,236,969.

Patented Aug. 14, 1917.

2 SHEETS—SHEET 2.



Witnesses:
Arthur K. Daniel,
M. G. Donnell.

Floyd S. Mucky, Inventor.
By his Attorney,
W. B. Hutchinson

UNITED STATES PATENT OFFICE.

FLOYD S. MUCKEY, OF NEW YORK, N. Y., ASSIGNOR TO MUCKEY PATENTS CORPORATION,
A CORPORATION OF NEW YORK.

METHOD OF SOUND PRODUCTION.

1,236,969.

Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed May 5, 1914, Serial No. 836,445. Renewed November 11, 1916. Serial No. 130,916.

To all whom it may concern:

Be it known that I, FLOYD S. MUCKEY, a citizen of the United States, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Methods of Sound Production, of which the following is a full, clear, and exact description.

My invention relates to improvements in a method of recording, producing and reproducing sounds, and more particularly the recording, the production and reproduction of musical tones. After a long and very careful study of many of the voices of singers and of the tones of musical instruments, by photographic analyses, I have found that pleasing tones are obtained where there is a strong fundamental tone and where the overtones are diminished in intensity. The sensations produced upon the ear by the sound production of any musical instrument consist of first, that series of partial tones which the particular vibrator originates, and second, sound other than the above mentioned partial tones.

The second are undesirable sounds. Very high and strong partial tones are also classified as undesirable. If the desired partial tones, especially the fundamental and lower overtones are amplified and the undesirable sounds are subordinated to such an extent that they are not noticeable, then a good tone quality is obtained. My efforts have been along this line, and the object of my method is to produce this good quality of tone by amplifying and strengthening the desired partial tones to their proper intensity through resonance, and suppress or subordinate the undesirable sounds. I have found that this can be accomplished if, for example, a resonance chamber is shaped so as to provide substantial reinforcement for the desired partial tones, and if the walls are shaped toward the outlet so as to gradually merge and condense the sound waves contiguous to or as they leave the outlet. For example, a sound box for graphophones and like instruments constructed in accordance with my ideas provides a substantial

resonating chamber in which the sound waves of the fundamental and lower overtones are amplified and reinforced in their proper relation to good quality and the sound box is made so as to gradually deflect and transmit the same to the outlet without substantial reflection back toward the inlet, whereby harmful interference is prevented. In such a device as the sound box above described the desired partial tones are reinforced to such an extent that the substantially unreinforced, undesirable sounds are subordinated and repressed, and a tone of strong volume and good quality is produced.

The waves of the fundamental and lower overtones as they leave a properly constructed vibrator are much stronger than the waves of the higher overtones, and consequently if means are provided for resonating, amplifying or reinforcing these strong sound waves, the weaker waves above referred to will as a matter of course, through insufficient reinforcement, be suppressed and rendered unnoticeable. I have also found that in order to secure the best use of resonance, the condensation or merging of the sound waves should occur contiguous to the outlet, and remote from the inlet.

Reference is to be had to the accompanying drawings forming a part of this specification in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a longitudinal section of a double sound box embodying my invention and adapted to carry out my improved method.

Fig. 2 is an end view of the structure shown in Fig. 1.

Fig. 3 is an end view of a single sound box and diaphragm.

Fig. 4 is a longitudinal section of the structure shown in Fig. 3 and also shows diagrammatically the relative intensities of the different sound waves set up by the diaphragm.

Fig. 5 is a diagram or chart of the partial tones produced by the voice or by stringed instruments.

Fig. 6 is an enlarged diagrammatic view showing the course of the sound waves through the sound box.

The chart or diagram shown in Fig. 5 is drawn to represent the fundamental and overtones of stringed instruments and the voice and while the chart may not be accurate it will serve to bring out the theory of my invention. It will be noted that the sound waves of the fundamental tone which I have marked C^1 are strong and long, and I have found from a careful study that in the best voices and the best musical tones this fundamental tone strongly predominates. The first overtone which I have marked C^2 is the most harmonic interval and it will be seen that this sound wave is also strong but less so than the fundamental tone. The third partial tone which is G^2 and is the second overtone is the next most harmonic interval, and it will be observed that this wave is shorter and less strong than that of the first overtone, and so through the several gradations it will be observed that the sound waves become shorter and relatively weaker until at the eighth and ninth overtones the sound waves which at this point represent tones of extremely high pitch are very short and comparatively weak.

For example, in Fig. 1, I have shown a double sound box having the desired shape. In this case a diaphragm 10 having a stylus 11, is used, and the diaphragm is held by a suitable ring 13. The peculiar curve of the sound box 14 will be noted, and I have found it desirable to provide a substantial resonance chamber the walls 14^a of which form an interiorly concave-convex curve which terminates when the convex curve takes a direction which is perpendicular to the diaphragm. It will be noticed that the wall 14^a of the sound box curves outward and gradually inward to about the point *a*, when it becomes less sharp but still curves inward as at *b*, and finally outward as at *c* to the outlet 15. Instead of having a sound box double it can be used single as in Fig. 4, the shape being precisely the same except that one end of the sound box is left off.

Referring to Fig. 4 the relative sound wave intensities are diagrammatically represented. Here the strong waves representing the desired partial tones are shown as 16 while the sound wave intensities of the undesirable sounds are represented by the numeral 17.

The general course of the sound waves through the sound box will be understood by reference to the diagrammatic view in Fig. 6. It will be seen that many of the sound waves are deflected and merged or

condensed contiguous to the outlet while relatively few are finally reflected back toward the inlet, which backward reflection I shall hereinafter term "counter-reflection." By referring to this figure it will be noticed that the several sound waves are numbered and indicated by arrows, so that the points where they strike the wall of the sound box and the paths of their deflections are noted. This diagram is drawn with scientific accuracy, and it will be seen that practically all the sound waves are condensed at or near the outlet. This condensation of the sound waves is essential to resonance which is the important factor in the production of good volume and quality.

From the foregoing description it will be seen that I have devised a method of sound production, which

First, provides a substantial resonance cavity with a restricted outlet for reinforcing the desired partial tones of any complex sound and thus insures the best possible quality and volume of tone.

Second, provides a resonance chamber which while affording a substantial resonance cavity to reinforce the desired partial tones deflects the sound waves toward the outlet in such a manner that only a small percentage of them return toward the inlet to cause interference with volume and quality.

Third, provides a resonance chamber which condenses the sound waves in or contiguous to the outlet and remote from the inlet.

Having described my invention, I claim:—

1. The method of sound production comprising the origination of composite sounds, reinforcing the fundamental and lower overtones thereof, with the greatest intensity, by a resonance chamber, thereby subordinating the higher overtones, and transmitting the same without substantial counter-reflection whereby harmful interference is prevented.

2. The method of sound production comprising the origination of composite sounds, reinforcing the fundamental and lower overtones with the greatest intensity by a resonance chamber, thereby subordinating the higher overtones, and condensing the same contiguous to the outlet without substantial counter-reflection, whereby harmful interference is prevented.

3. The method of sound production comprising the origination of composite tones, reinforcing the fundamental and lower overtones by a resonance chamber so that the fundamental tone will predominate and the overtones be subordinated, and condensing the reinforced sound waves contiguous to the outlet without substantial counter-reflection, whereby the greatest resonance is

provided for the production of good volume and good quality.

4. The method of sound production comprising the origination of composite sounds, reinforcing the fundamental and lower over-
5 tones with the greatest intensity by a resonance chamber, thereby subordinating the higher overtones, condensing the same con-

tiguous to the outlet without substantial counter-reflection, and discharging the tones
immediately after the same are reinforced. 10

FLOYD S. MUCKEY.

Witnesses:

WARREN B. HUTCHINSON,

FRANK S. APPLEMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

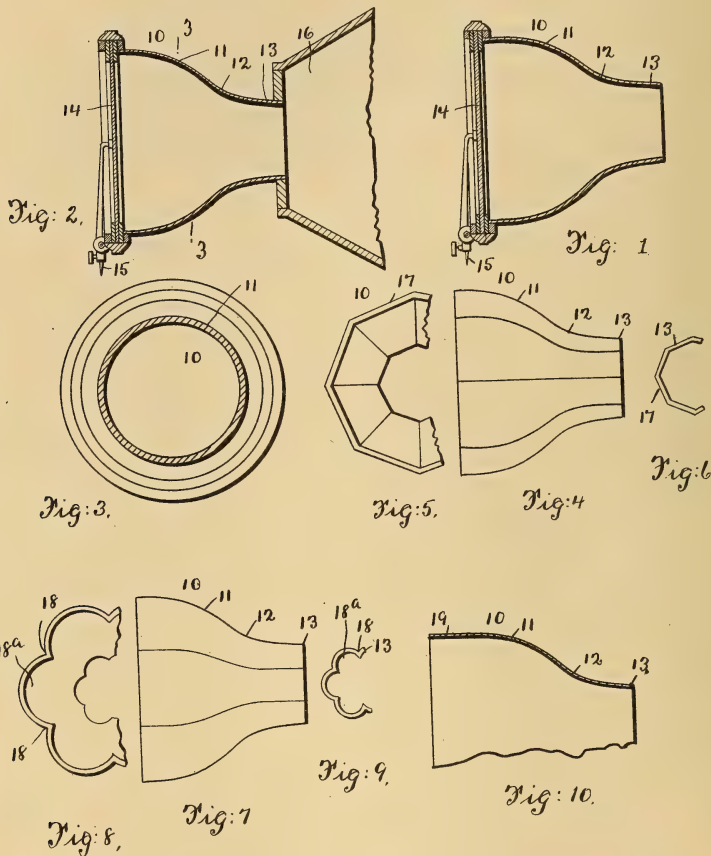
SOUND BOX,
#1,236,970-----F.S.Muckey,
Patented-August 14th, 1917.
Filed-July 14th, 1914.
Renewed-Nov. 11th, 1916.

F. S. MUCKEY.
SOUND BOX.

APPLICATION FILED JULY 14, 1914. RENEWED NOV. 11, 1916.

Patented Aug. 14, 1917.

1,236,970.



Witnesses:
Arthur L. Danvers,
M. G. C. Donnell.

Floyd S. Muckey, Inventor,
By his Attorney
W. B. Hutchinson.

UNITED STATES PATENT OFFICE.

FLOYD S. MUCKEY, OF NEW YORK, N. Y., ASSIGNOR TO MUCKEY PATENTS CORPORATION, A CORPORATION OF NEW YORK.

SOUND-BOX.

1,236,970.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed July 14, 1914, Serial No. 851,000.

Renewed November 11, 1916. Serial No. 130,917.

To all whom it may concern:

Be it known that I, FLOYD S. MUCKEY, a citizen of the United States, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Sound-Boxes, of which the following is a full, clear, and exact description.

My invention relates to improvements in the art of recording, producing and reproducing sounds, and more particularly the recording, the production and reproduction of musical tones. After a long and very careful study of many voices of singers and of the tones of musical instruments, obtained by photographic analyses, I have found that pleasing tones are obtained where there is a strong fundamental tone and where the over tones are diminished in intensity. It is well known that some of the overtones are very harmonic, others are less harmonic and still others are strictly inharmonic. The sensations produced upon the ear by the sound production of any musical instrument consist of first, that series of partial tones which the particular vibrator originates, and second, sound other than the above-mentioned partial tones. The second are undesirable sounds. The relatively very high and strong partial tones are also classified as undesirable. If the desired partial tones, especially the fundamental and lower overtones are amplified so as to subordinate the undesirable sounds to such an extent that they are not noticeable, then a good tone quality is obtained. My efforts have been along this line, and the object of my present invention is to provide means for producing this good quality of tone by amplifying and strengthening the desired partial tones to their proper intensity through resonance, and suppressing or subordinating the undesirable sounds by removing the conditions which reinforce them. I have found that this can be accomplished if the sound box is shaped so as to provide a substantial resonance chamber in which the desired partial tones are amplified, and if the walls are shaped toward the outlet so as to gradually merge and condense the sound waves as they leave the outlet. A sound box constructed in accordance with my ideas provides a substantial resonating chamber, the walls of which gradually merge from an interiorly concave to a convex curve which

terminates preferably when the convex portion of the curve takes a direction in which its tangent is perpendicular to the diaphragm. As generally constructed sound boxes, especially for phonographs, have some part of the wall in such relation to the direction of sound waves through the sound-box that most of the sound waves are reflected from the walls and directed back against the outgoing sound waves and the diaphragm so as to interfere with them, and therefore with the production of the best quality and good volume of tone. Moreover, the usual form of sound box is constructed in such a manner as to reinforce the partial tones in such a way that their relative intensities are not in the correct proportion for good tone quality and the undesirable sounds are strongly reinforced so that good tone quality cannot be produced; but by constructing the sound box in accordance with my invention, the waves of the fundamental and lower overtones are amplified and reinforced in their proper relation to good quality, and the sound box is made so as to gradually deflect but not substantially reflect the sound waves. Thus the desired partial tones are reinforced to such an extent that the substantially unreinforced undesirable sounds are relatively subordinated and repressed so that they are unnoticeable, and a strong volume of pleasing tone is produced. I have found with the use of the sound-box shaped after my invention that the high pitched sounds ordinarily termed "scratch", are much less noticeable and practically eliminated.

It is well known that the waves of the fundamental and lower overtones as they leave the unhampered vibrator, are much stronger than the waves of the higher harmonic or inharmonic overtones, and consequently if means are provided in a sound box for resonating and amplifying and reinforcing these stronger sound waves, the weaker sound waves above referred to will as a matter of course through lack of reinforcement, be suppressed and rendered unnoticeable. My experiments have also shown that where the sound-box merges into a relatively long and small diameter tone arm, the desired effect of these sound waves is lost and a much less desirable tone is produced than where the sound box terminates when my compound curve which forms its wall takes a direction in which its tan-

gent is perpendicular to the diaphragm; and if a horn is used at all, it should be used without the above described tone arm and should in its smallest diameter be larger than the outlet of the sound box.

In order to secure the best resonance the condensation or merging of the air waves should occur contiguous to the outlet.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a longitudinal section of a preferred form of the sound box without a horn.

Fig. 2 is a similar section of my improved sound box showing the same provided with a vibrator in the form of a diaphragm and connected with a horn.

Fig. 3 is a cross section on the line 3—3 of Fig. 2.

Fig. 4 is a side elevation of a slightly modified form of sound box which is polygonal in cross section.

Fig. 5 is a broken end view showing the larger end of the sound box illustrated in Fig. 4.

Fig. 6 is a broken end view of the smaller end of the said sound box.

Fig. 7 is a side elevation of a sound box having a corrugated wall.

Fig. 8 is a broken end view taken from the larger end of the sound box shown in Fig. 7.

Fig. 9 is a broken end view of the smaller end of the sound box shown in Fig. 7, and

Fig. 10 is a broken longitudinal section of another slight modification of the sound box in which the box is circular in cross section but has a larger resonance cavity.

The sound box 10 is relatively large and long at one end and small and short at the other, and the wall of the larger and the longer portion of the box is interiorly concave as shown at 11, this portion merging into a shorter convex portion 12, and the curve of the latter terminates in a reduced neck portion 13 which ends preferably when the convex curve takes a direction which is perpendicular to the diaphragm. Any usual or preferred means can be used for producing sound in the sound box, and I have shown a sound box provided at the larger end with a vibrator in the form of a diaphragm 14, having a stylus 15, and the diaphragm and stylus can be of any usual or preferred type, or other means of producing the sound can be substituted. The neck portion 13 of the sound box, if a horn is used, can discharge into a horn 16 without the intervention of a small diameter tone arm, as the use of such a tone arm has proven injurious to the tone produced by my form of sound box.

The longitudinal curve of the sound box should be substantially as shown in Figs. 1 or 2, that is to say, it must have a relatively large and long body portion as compared with the neck portion, and the wall of the box should form an interiorly concave-convex curve which as stated before preferably terminates when the convex curve takes a direction in which its tangent is perpendicular to the diaphragm. The cross sectional shape of the sound box can obviously be varied without affecting the principle of the invention. For instance, in Figs. 4 to 6 I have shown the sound box of polygonal cross section having faceted sides 17, and in Figs. 7 to 9 I have shown the wall of the sound box corrugated as at 18, thus forming internal flutes 18^a extending longitudinally of the sound box, forming additional resonance cavities.

In Fig. 10 I have shown the wall of the body portion of the sound box somewhat elongated at the larger end as at 19, the extension 19 being substantially parallel with the horizontal axis of the sound box, thus forming the larger portion of the resonance cavity, but in every instance the deflecting or conducting portion of the sound box is in the form substantially of an interiorly concave convex curve as illustrated.

It will be understood that some of the high pitched tones while not inharmonic, produce disagreeable tone quality if allowed to predominate, and in my improved form of sound box these tones are subordinates through lack of reinforcement in their relation to the fundamental tone.

My experiments have shown that the particular shape shown in the drawings is of the utmost importance, and it will be noticed by reference to such drawings that there is no portion of the sound box wall which will serve to directly reflect the sound waves toward the vibrator 14, or toward the inlet end of the box, but the wall of the sound box converges in the form shown, so that all the sound waves are deflected toward the outlet, and merge or condense contiguous to the outlet and only relatively few are finally reflected back to the diaphragm.

I wish to call attention further to the fact that I have shown the application of my improved sound box to a phonograph, in which case it will be obvious that the sound box can be used either as a recorder or reproducer as usual in such case, but I do not limit my invention to the use of a diaphragm, but claim it for any vibrator.

From the foregoing description it will be seen that my invention is designed to carry out the functions of a correct sound box for the following reasons:

First, it provides a substantial resonance cavity with a restricted outlet for reinforcing the desired partial tones of any complex

sound and thus insures the best possible quality and volume of tone.

Second, the wall of the sound box is of such shape as, while providing a substantial resonance cavity to reinforce the desired partial tones, it deflects the sound waves toward the outlet in such a manner that only a small percentage of them return to the diaphragm to cause interference with volume and quality.

Third, the shape of the interior wall of the sound box is such as to condense the sound waves in or contiguous to the outlet.

I claim:—

1. A sound box comprising a body and neck portion, the diameter of the former being much greater than the diameter of the latter, and the length of the former being much greater than the length of the latter, whereby the entrance portion of the neck is relatively remote from the inlet of the body portion, said body and neck portions having a smooth, interiorly concave convex curvature, and terminating in the short restricted neck portion.

2. A sound box having a diaphragm and a part contiguous to the diaphragm forming a substantially long and large body portion of a resonance cavity, the interior wall of which merges in a smooth concave convex curve into the wall of a substantially short and small neck portion which ends in an outlet when the convex curve takes a direction in which its tangent is perpendicular to the diaphragm.

3. A sound box having its body portion of a substantially large diameter and length with the wall of this body portion interiorly concavely curved in longitudinal section, and a neck portion of substantially small diameter and length with its wall interiorly convexly curved in longitudinal section, the said body and neck portions merging with each other, and the wall of the said neck portion ending in a reduced outlet when the convex curve takes a direction in which its tangent is perpendicular to the diaphragm.

4. A sound box comprising a body and a neck portion, the diameter of the former being much greater than the diameter of the latter, and the length of the former being much greater than the length of the latter, whereby the entrance portion of the neck is relatively remote from the inlet of the body portion, said body and neck portions having a smooth interiorly concave convex curvature and terminating in the short restricted neck portion, and with all parts of the wall shaped to deflect the sound waves toward the outlet.

5. A sound box having a substantially large and long body portion, a vibrator at the inlet end of the box, a substantially short

neck portion of reduced diameter merging interiorly with the body portion in a smooth convex concave curve shaped to deflect sound waves toward the outlet, and with the wall of the neck portion ending when its convex curve takes a direction in which its tangent is perpendicular to the diaphragm, and a horn connected directly with the outlet and with its smallest diameter larger than that of the said outlet.

6. A sound box comprising a body and neck portion, the diameter of the former being much greater than the diameter of the latter, and the length of the former being much greater than the length of the latter, whereby the entrance portion of the neck is relatively remote from the inlet of the body portion, said body and neck portions having a smooth, interiorly concave convex curvature and terminating in the short restricted neck portion, the curve of the interior wall being such as to condense the sound waves contiguous to the outlet.

7. A sound box having a diaphragm and a part contiguous to the diaphragm forming a substantially long and large portion of a resonance cavity, the interior wall of which merges in a smooth concave convex curve into the wall of a substantially short and small neck portion which ends in an outlet when the convex curve takes a direction in which its tangent is perpendicular to the diaphragm, the interior wall of the box extending from the inlet to the outlet in the form of a smooth concave convex curve of such curvature as to deflect the major portion of the sound waves through the outlet.

8. A sound box having a substantial resonance cavity, the inner wall of the box forming a concave convex curve which ends in a reduced outlet, the curve of the wall terminating when its tangent is perpendicular to the vibrator and these curves being of such curvature as to deflect substantially all the sound waves toward the outlet and to condense the same contiguous thereto, and a vibrator extending across the inlet end of the box at substantially its largest diameter.

9. In combination, a sound box having a diaphragm, a substantially long and large body portion and a substantially short and restricted neck portion, said portions having an interior concave convex curvature ending where the tangent to the convex curve is perpendicular to the diaphragm, and a horn having an inlet substantially larger than the outlet of the neck portion and directly connected thereto.

FLOYD S. MUCKEY.

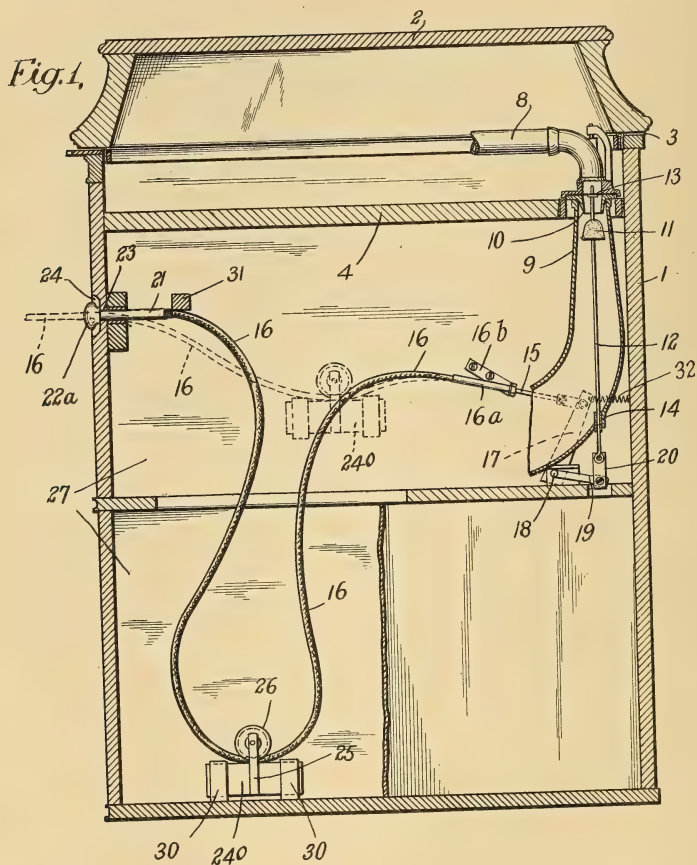
Witnesses:

WARREN B. HUTCHINSON,
A. MERCER PARKER.

MUSICAL INSTRUMENT,
#1,237,179-----Joseph Hunter Dickinson,
Patented-August 14th, 1917.
Filed-January 29th, 1915.

1,237,179.

2 SHEETS--SHEET 1.



WITNESSES

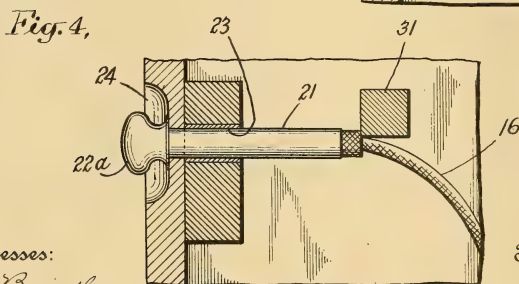
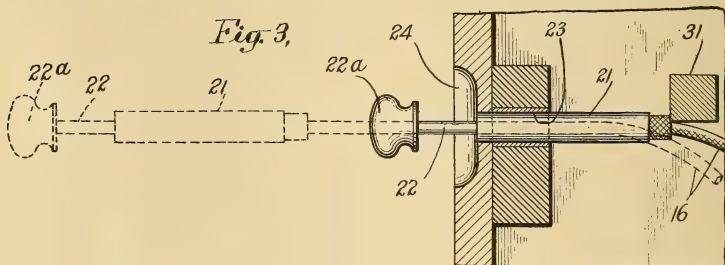
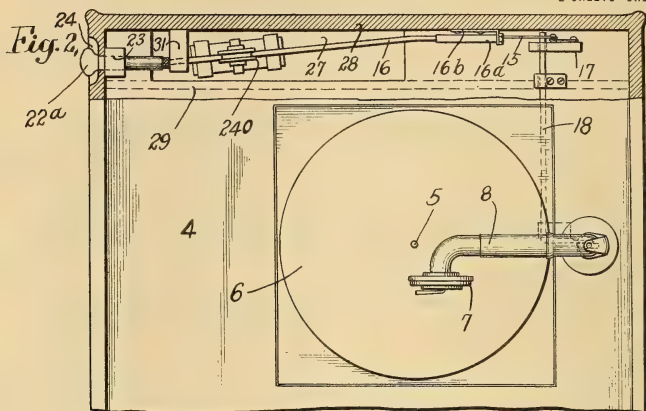
C. W. Brindley.
J. F. Watkins

INVENTOR
Joseph Hunter Dickinson
BY
Edw. Scherr Jr.
ATTORNEY

1,237,179.

Patented Aug. 14, 1917.

2 SHEETS—SHEET 2.



Witnesses:

C. W. Brindley.
J. L. Wilkins

Inventor

Joseph Hunter Dickinson
By *Attorney*
E. W. Schuch

UNITED STATES PATENT OFFICE.

JOSEPH HUNTER DICKINSON, OF CRANFORD, NEW JERSEY, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

MUSICAL INSTRUMENT.

1,237,179.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed January 29, 1915. Serial No. 5,046.

To all whom it may concern:

Be it known that I, JOSEPH H. DICKINSON, a citizen of the United States, residing at Cranford, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Musical Instruments, of which the following is a specification.

My present invention relates to automatic musical instruments having expression means operable by a flexible control in the hands of the player of the instrument, and particularly relates to means and adaptations for the housing of said control when not in use without interfering with its ready withdrawal for use. In the drawings I have illustrated my invention in connection with a phonograph. Figure 1 is a vertical front to back section partly in elevation through a talking machine embodying my invention; Fig. 2 is a horizontal section partly in plan of the same; Figs. 3 and 4 are enlarged views of a detail in Fig. 1, showing the control handle withdrawn and its different positions assumed in the act of seating it in the opening provided for it in the cabinet, Fig. 4 showing its fully seated position.

Describing now the specific devices of the drawings, 1 is the cabinet of a phonograph, 2 its lid hinged at 3 to the back of the cabinet, and 4 is the top shelf through which as usual projects the motor spindle 5 bearing the record turn-table 6. 7 is the reproducer, 8 the tone-arm connecting with the neck of the horn 9 wherein is located an expression device comprising a flexible throat 10 and valve 11, the latter supported on a valve stem 12 for reciprocal movement relatively to the throat 10. For this purpose the upper end of the valve-stem is received and guided by an opening in a narrow cross-piece 13, whereas its lower end projects slidably through an opening 14 in the horn. The valve-stem is reciprocated by flexible control means comprising a wire 15 slidable in a sheath 16. The inner end of the sheath is fixed, being secured to a sleeve 16^a attached by a bracket 16^b to the inside of the cabinet. The wire 15 continues through the sleeve 16^a for pivotal connection with a crank-arm 17 on rock-shaft 18 having another crank-arm 19 connected by link 20 with the valve-stem. An operating handle is provided comprising a sleeve 21 secured to the free or outer end of the sheath 16 in

continuation thereof; and a headed rod 22 secured to the end of the wire 15. It will be apparent from the described mechanism, elsewhere claimed, that the valve may be adjusted relative to the throat by reciprocating the handle parts 21 and 22 on each other.

When out of play the flexible control is invisible to any one looking at the instrument, it being housed within the cabinet as shown by the full lines in Fig. 1 with its operating handle located in a hole or opening 23 through the cabinet and only projecting sufficiently therefrom to be conveniently grasped by the player to draw out the handle, followed by the flexible control though the opening 23 preparatory to playing the instrument by manipulating the handle to adjust the expression-valve 11.

The opening 23 is shown through the front of the cabinet at the left side (*cf.* Fig. 2) surrounded by a circular recess or cup 24. This minimizes the extent to which the knob or head 22^a of the handle projects in non-playing position and at the same time makes it easier for the player to grasp it for withdrawal.

The flexible control may be re-housed simply by pushing it back endwise through the hole 23 or means may be provided for making this operation more automatic. Such means is shown in Fig. 1 comprising a weight 240 having a strap 25 providing bearings for a pulley 26 which runs on the flexible control. When the flexible control has been drawn out through the hole for playing the instrument, this weight is lifted to the top of the pocket 27 in which it works and is housed. The horizontal section of this pocket is shown in Fig. 2 and its sides consist of the side 28 of the cabinet and an adjacent spaced vertical partition 29. When through playing the weight automatically pulls the flexible control back into the cabinet. 30—30 are felt bands around the weight to prevent noise as it strikes the side and bottom of the pocket.

The handle consisting of the described headed rod 22 telescoping in the sleeve 21 is so connected with the valve 11 that when the rod is fully telescoped into the sleeve, the valve is widest open for loudest playing as shown in Fig. 1. To prevent the handle from being housed in its opening in the cabinet in any other than said fully telescoped

condition for loudest playing, a stop 31 is provided (*cf.* Figs. 1, 3 and 4) which contacts with the sleeve when in fully housed position and stops its further motion through the hole 23. Further housing movement of the handle is therefore possible only for the rod 22 whose movement accordingly continues until its head 22^a strikes the end of sleeve, in which condition the parts are fully telescoped for loudest playing. Ordinarily the valve or other expression device could be connected so that, when the handle parts have been fully telescoped on each other whether by the stop or otherwise, the playing shall be soft instead of loud as just described.

A spring 32 (Fig. 1) may also be provided tending to maintain the handle parts in telescoped condition.

Having thus described my invention, what I claim is:

1. In a musical instrument, the combination, with a casing and an expression device therewithin; of a flexible control means for actuating said expression device at a point remote from the instrument, normally housed within the casing when not in use, and adapted to be drawn outwardly from said casing preparatory to operation; and means for automatically retracting said control means into said casing at the conclusion of operation.

2. In a musical instrument, the combination, with a casing having a hole in one of its sides, a tone arm, and a horn within the casing connected with said tone arm, said tone arm and horn constituting a continuous

sound conduit; of an expression device disposed within said conduit; and a control means for actuating said expression device at a point remote from the instrument, arranged entirely exterior to the sound conduit and normally housed within the casing, and adapted to be drawn outwardly from said casing through said hole preparatory to operation; said control means being operatively connected with said expression device.

3. In a musical instrument, the combination, with a casing having a hole in one of its sides, and a continuous sound conduit within said casing; of an expression device disposed within said conduit; a flexible control means for actuating said expression device at a point remote from the instrument, arranged entirely exterior to the sound conduit and normally housed within the casing, and adapted to be drawn outwardly from said casing through said hole preparatory to operation; said control means being operatively connected with said expression device, and having a terminal handle which is supported in said hole when the control means is not in use; and means for automatically retracting said control means into said casing at the conclusion of operation.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 27th day of January 1915.

JOSEPH HUNTER DICKINSON.

Witnesses:

J. F. MEADE,

E. W. SCHERR, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

STYLUS FOR SOUND-REPRODUCING MACHINES,
 #1,237,230-----Willis R. Whitney,
 Patented-August 14th, 1917.
 Filed-March 19th, 1915.

W. R. WHITNEY.
 STYLUS FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED MAR. 19, 1915.

1,237,230.

Patented Aug. 14, 1917.

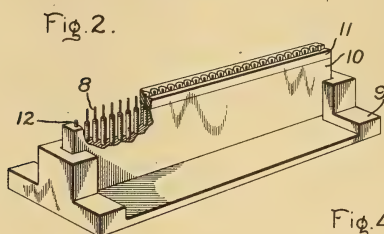
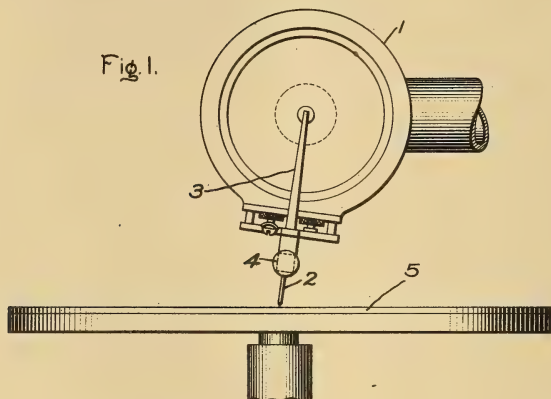


Fig. 3.



Fig. 5.

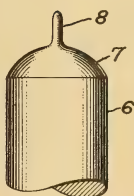


Fig. 4.



Inventor:
 Willis R. Whitney,
 by *Alfred B. Davis*
 His Attorney.

UNITED STATES PATENT OFFICE.

WILLIS R. WHITNEY, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

STYLUS FOR SOUND-REPRODUCING MACHINES.

1,237,230.

Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed March 19, 1915. Serial No. 15,541.

To all whom it may concern:

Be it known that I, WILLIS R. WHITNEY, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Styli for Sound-Reproducing Machines, of which the following is a specification.

My present invention relates to styli for sound reproducing machines, and more particularly to styli or needles having a tip of tungsten or tungstenic material, such as are described in U. S. Letters Patent No. 1,080,924.

The object of my invention is to provide an improved method of and means for securing the tip to the body portion of such needles whereby they may be produced economically and will be efficient in their operation as well as durable.

The point of such a needle should preferably have a diameter approximately equal to the width of the groove in the sound record with which it is to be used or about .006 of an inch.

I have found that such needles may be made to advantage by securing the tungsten point directly to the end of the body portion by means of a body of metal having a lower melting point than either the point or the body portion.

In carrying my invention into effect I have found that copper or an alloy thereof is most suitable for joining the tungsten point to the body portion. This is because of the fact that under non-oxidizing conditions molten copper readily wets tungsten and also wets the steel which preferably forms the body portion of the needle. The copper used is preferably first treated with a small quantity of an oxidizable boron material as described in Weintraub Patent #1,023,604. In joining the point to the body portion I have found that there is a tendency for the copper to run down over the sides of the body portion. In order to secure a uniform product it is necessary to use for each needle a predetermined amount of the metal which forms the union between the point and the body portion which amount should be just sufficient to properly join the two parts. If

in some cases a part of this metal runs over the side of the body portion the junction between the point and the body portion will be defective. I have found that this difficulty may be overcome by treating the sides of the body portion in such a way that they will not be wet by the molten copper. This has the additional advantage of causing the copper when molten to form a rounded globule on the end of the body portion and if the point is placed in the center of this globule the desired form of needle may be obtained by the joining operation without any further mechanical treatment.

My invention with further objects and advantages will best be understood by reference to the following description taken in connection with the accompanying drawing in which Figure 1 represents the sound box of a sound reproducing machine provided with a stylus, constructed according to my invention, in engagement with a sound record tablet; Fig. 2 shows a convenient form of support for holding the needles while the points are being attached to the body portions; Fig. 3 shows the parts of a needle before they are joined together; Fig. 4 shows the needle after the parts have been joined together; and Fig. 5 is a greatly enlarged view of the point end of a completed needle.

The sound box 1 of the sound reproducing machine shown in Fig. 1 is provided with one of my improved styli 2 secured to the transmission arm 3 by means of a suitable holding device 4 and the point of which rests on a sound record tablet 5. The sound box transmission arm and holder however form no part of my present invention but are shown merely to illustrate one way in which my improved stylus may be used.

The body portion 6 of the stylus illustrated in Figs. 3, 4 and 5 is preferably of steel. The metal for joining the point to the body portion may be prepared in the form of a small disk 7 of the same diameter as the body portion. These disks may be easily made by punching them out of a sheet of the required thickness. The point 8 preferably consists of a short section of tungsten wire of the desired size or about .006 of an inch in diameter. The parts of the

needles as shown in Fig. 3 may be assembled for the joining operation in a support of the type illustrated in Fig. 2. This consists of a base portion 9 having slotted ends adapted to receive an upright perforated body portion 10. The perforations in this body portion of the holder are made of slightly larger diameter than the body portions of the needles. When the portions 6 and 7 of the needles are assembled in the body portion 10 of the holder they may conveniently be substantially flush with the top thereof. A perforated cover 11 which may be held in its proper position by pins 12 at each end is then placed over the body portion 10. The points 8 are then inserted in the perforations in the cover which register with the perforations in the body portion 10. When the parts have been thus assembled the support is placed in a hydrogen furnace heated to a temperature at which the copper disks 7 will melt. As soon as these disks melt the points 8 drop down into the molten metal and may touch the ends of the body portions 6. The supporting member with the needles therein is then withdrawn from the heated section of the furnace and allowed to cool while still in the hydrogen atmosphere and when cool it will be found that the points are securely attached to the body portions. The needles may then be removed from the support. If the operation has been properly carried out the needles should have the appearance indicated in Fig. 4; that is, the joining metal should have substantially the form of a hemisphere with the point protruding from the center thereof. Since the tungsten is wet by the copper the surface of the copper around the point will be slightly raised as indicated more clearly in Fig. 5.

In order that the needles shall have this form I have found it necessary to treat the cylindrical surface of the body portion 6 in such a way that it will not be wet by the molten copper, otherwise the copper will run down over the body portion, and cause the needles to stick to the supporting member. When this happens too there may not be enough metal left to properly join the point to the body and the metal that is left instead of having a rounded surface as desired, will have a flat surface. I have found that the desired effect may be secured by forming on the surface of the body portion 6 a coating of an inoxidizable alloy of aluminum and iron. This may be done by heating the body portion in contact with powdered aluminum under non-oxidizing conditions as described in an application filed by Tycho Van Aler October 4, 1911, Serial No. 652,756. A comparatively thin coating is sufficient for my purpose and the necessary thickness may be secured by heating about half an hour in the manner described in the

above-mentioned application. It is of course necessary that the coating of alloy should not cover the end of the body portion 6 to which the point is attached. I find it convenient to form the coating on long rods of the proper diameter and from these rods cut the body portions to the desired length. This will give a clean end surface to which the point may easily be secured.

The points 8 may be cut from tungsten wire of the desired size which has first been carefully straightened and cleaned so that the copper will adhere to it readily. They may be cut to such a length that when the joining operation is completed they will protrude the desired amount from the joining metal. Since this distance is very small and any variation therein is not desirable considerable accuracy in the construction of the supporting member and in the assembly of the needles therein may be required to secure the proper length of points in this way. On this account it may be desirable to cut them at first longer than necessary and trim them all to a uniform length after the joining operation has been completed. As a final step in preparing the needles for use on a sound reproducing machine it is desirable to subject them to a buffing process to remove any sharp corners and give the points the smooth rounded appearance shown in Fig. 5.

While I have described but a single embodiment of my invention it will be apparent that many modifications may be made in the form of the parts used and in the final form of the completed needles without departing from the scope of the appended claims. It will also be apparent that the method which I employ for joining the tungsten points to the body portions may also be useful for other purposes than the manufacture of needles for sound reproducing machines.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The method of joining a tungsten point for a stylus for sound reproducing machines to a steel body portion which consists in first forming on the side of the steel body a thin film of an alloy which is not wet by molten copper and then melting a disk of copper on the end of said body portion under non-oxidizing conditions with the tungsten point in contact with the copper disk.

2. The method of joining a body of tungsten to the end of an elongated steel body which consists in first forming on the side of the steel body a thin film of an alloy which is not wet by molten copper and then melting a body of copper on the end of said steel body under non-oxidizing conditions with the tungsten body in contact with the copper.

3. The method of joining a tungsten point for a stylus for sound reproducing machines

to a body portion of a different metal by means of a joining metal having a lower melting point than the tungsten point or the body portion, which consists in first forming on the side of the body portion a coating of a material which is not wet by the joining metal when the latter is molten, and

then melting a body of the joining metal on the end of the body portion with the tungsten point in contact with the joining metal. 10

In witness whereof, I have hereunto set my hand this 18th day of March, 1915.

WILLIS R. WHITNEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

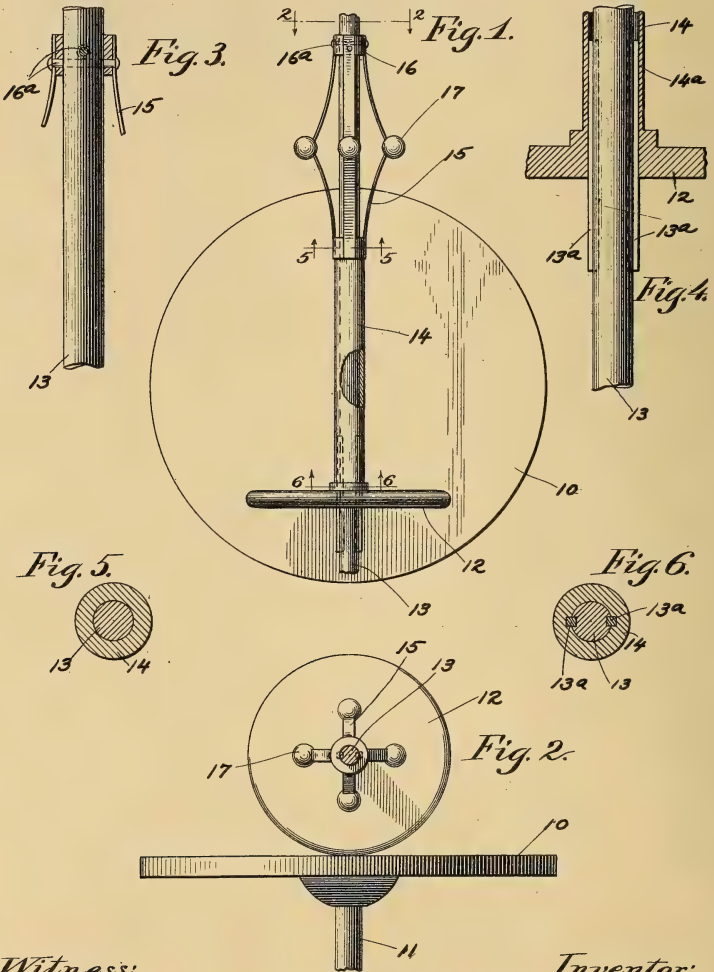
FRICION SPEED REGULATOR OR GOVERNOR

1,237,409 ----- J. A. Swart,
Patented - Aug. 21, 1917.
Filed - Sept. 25, 1916.

J. A. SWART.
 FRICTION SPEED REGULATOR OR GOVERNOR.
 APPLICATION FILED SEPT. 25, 1916.

1,237,409.

Patented Aug. 21, 1917.



Witness:
 C. Durnap

Inventor:
 John A. Swart
 By Sheridan, Wilkinson and Scott Attys

UNITED STATES PATENT OFFICE.

JOHN A. SWART, OF DULUTH, MINNESOTA.

FRICTION SPEED REGULATOR OR GOVERNOR.

1,237,409.

Specification of Letters Patent.

Patented Aug. 21, 1917.

Application filed September 25, 1916. Serial No. 122,113.

To all whom it may concern:

Be it known that I, JOHN A. SWART, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Friction Speed Regulators or Governors, of which the following is a specification.

This invention relates to speed regulators and has for its object to provide a device of that nature which will automatically control the speed of a driven element. Still another object resides in the specific construction and details of my improved device. These and other advantages will be more fully set forth and described in the following specification and shown in the accompanying drawing;

In which—

Figure 1 is a plan view of my invention, a portion thereof being shown in section; Fig. 2 is an end elevation of the same; Fig. 3 is a detail of the governor attachment;

Fig. 4 is a detail of the sliding disk and shaft;

Fig. 5 is a transverse section along the line 5—5 of Fig. 1; and

Fig. 6 is a similar section along the line 6—6 of Fig. 1.

Like numerals refer to like elements throughout the drawing in which 10 is a rotatable disk secured to a shaft or spindle 11, and constructed and arranged for driving by a driving disk 12 whose axis is parallel to the plane of disk 10 and the periphery of which is in frictional contact with the surface of the disk 10, this being a well known form of power transmission.

The disk 12 is centrally apertured and is mounted on the driving shaft 13, the latter being provided with splines 13^a, the hub or central portion of the disk 12 being suitably grooved or slotted to slide upon the splines 13^a. Secured to the disk 12 and projecting outwardly therefrom, is the tube 14, fitting around shaft 13 and slidable thereon, this tube being shown in Fig. 4 as formed integral with the disk 12 and as having suitable keyways 14^a comprising a continuation of the keyways in disk 12. At its outer end, the tube 14 has attached to it a plurality of leaf-springs 15, each of which has its other end attached to a collar 16 by pins 16^a, or the like. Intermediate their extremities these springs 15 carry the ball weights

17 attached thereto. Pins 16^a extend through the shaft 13 and serve to secure the collar 16 thereto.

In operation, suitable power being applied to the shaft 13 to rotate the same, the disk 12 will be rotated therewith and a consequent rotation will be imparted to disk 10 to impel or rotate the spindle 11, from which the power may be taken for any suitable use. To maintain the speed of the driven disk 10 approximately constant, the leaf-springs 15 and the ball weights 17 are selected of proper dimension and weight, and inasmuch as the same rotate with the tube 14 and the shaft 13, a centrifugal action of the balls 17 is such as to draw the disk 12 through the medium of the tube 14 toward the center of the disk 10 as the speed of the shaft 13 and consequent centrifugal action of the balls 17 increases. This centrifugal action is resisted by the springs 15, and proper selection of the latter and the ball weights will result in a balance obtaining at the desired speed of rotation, so that the same will be maintained approximately constant. As will be obvious when the speed of the shaft 13 drops, the centrifugal action of the balls 17 will decrease, and disk 12 will be moved toward the periphery of the disk 10 so that an increased driving ratio will be obtained and fewer revolutions of the disk 12 will result in maintained constant speed of the driven disk 10.

It will be obvious that my invention is susceptible of modifications and improvements, and I do not wish to be restricted to the form shown except as defined in the appended claims.

What I claim is:

1. In combination, a driven disk, a driving disk in contact therewith and arranged to transmit rotation thereto, and means to automatically move said driving disk relative to said driven disk to maintain the speed of the latter constant during varying speeds of the former, said means comprising ball and spring members rotating with said driving disk.

2. In combination, a driven disk, a driving disk in contact therewith and arranged to impart rotation thereto, a driving shaft, said driving disk rotating with said shaft and slidable thereon, and means to slide said driving disk on said shaft and across the face of said driven disk.

3. In combination, a driven disk, a driv-

ing disk in contact therewith and arranged to impart rotation thereto, a driving shaft, said driving disk rotating with said shaft and slidable thereon, and means to slide said driving disk on said shaft and across the face of said driven disk, said means comprising a ball governor.

4. In combination, a driven disk, a driving disk in contact therewith and arranged to impart rotation thereto, a driving shaft, said driving disk rotating with said shaft and slidable thereon, and means to slide said driving disk on said shaft and across

the face of said driven disk, said means comprising a plurality of spring members having one end operatively attached to said shaft, the other end to said driving disk, said springs being provided with ball weights intermediate their extremities.

In testimony whereof, I have subscribed my name.

JOHN A. SWART.

Witnesses:

JOHN MONAGHAN,
W. G. SWART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TELEGRAPHONE

1,237,496 ----- Fankhauser & McGrillis
Patented - Aug. 21, 1917,
Filed - June 8, 1911.

C. K. FANKHAUSER & A. M. McCRILLIS.

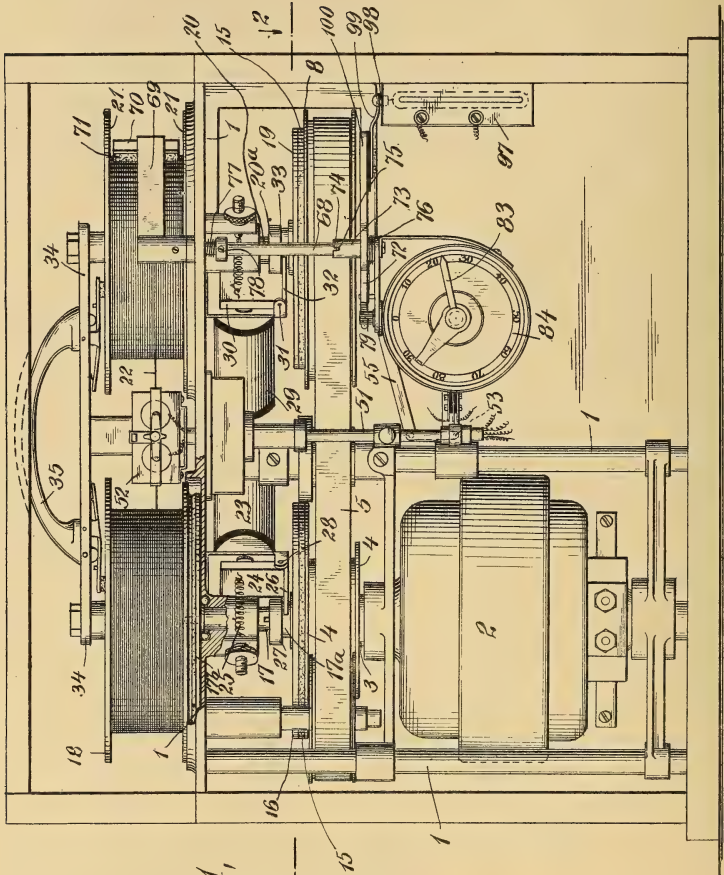
TELEGRAPHONE.

APPLICATION FILED JUNE 8, 1911.

1,237,496.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 1.



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Fig. 1,

2

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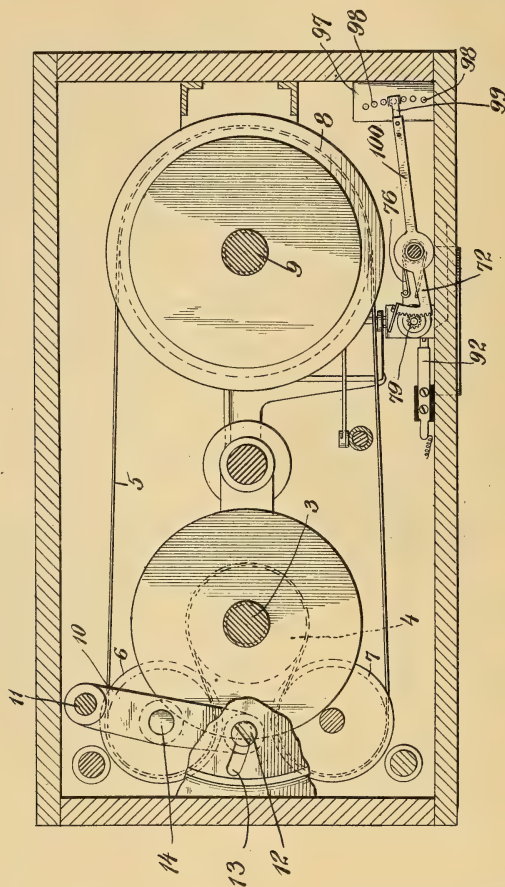
C. K. FANKHAUSER & A. M. McCRILLIS.
TELEGRAPHONE.

APPLICATION FILED JUNE 8, 1911.

Patented Aug. 21, 1917.
6 SHEETS—SHEET 2.

1,237,496.

Fig. 2.



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C. K. FANKHAUSER & A. M. McCRILLIS.
TELEGRAPHONE.

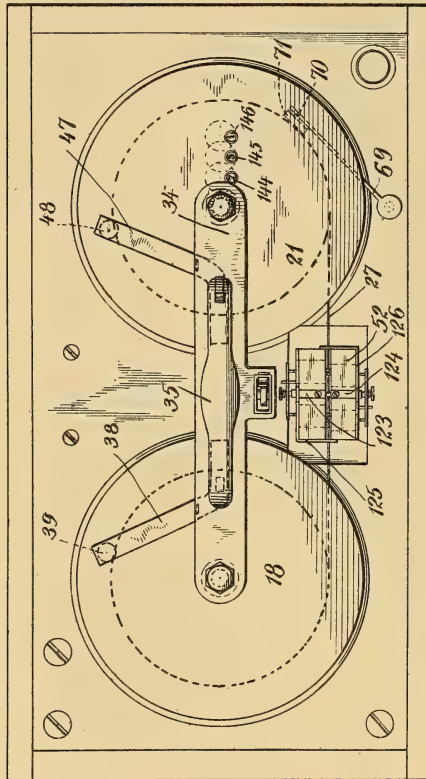
APPLICATION FILED JUNE 8, 1911.

1,237,496.

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6 SHEETS—SHEET 3.

Fig. 3



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TELEGRAPHONE.

APPLICATION FILED JUNE 8, 1911.

1,237,496.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 4.

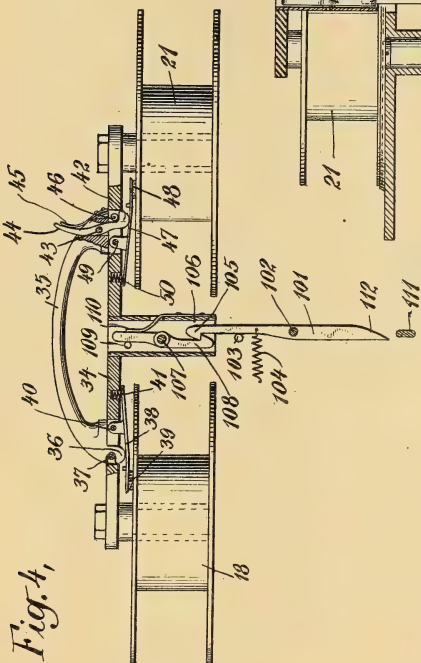


Fig. 4,

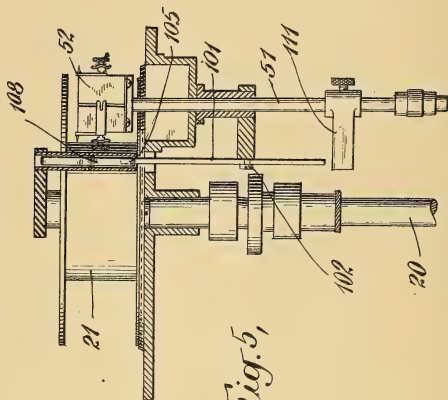


Fig. 5,

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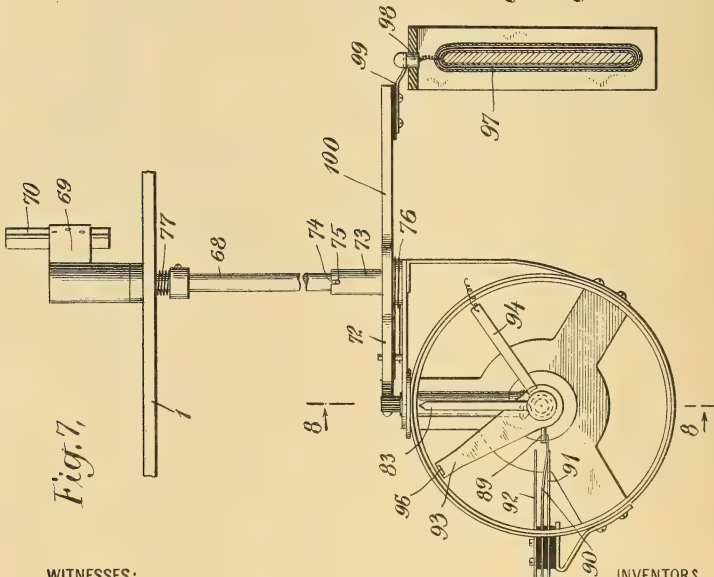
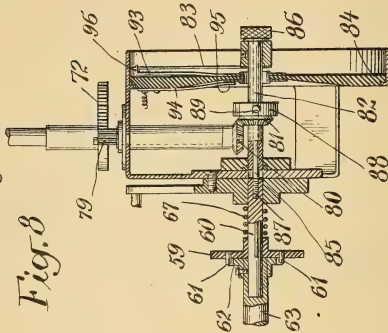
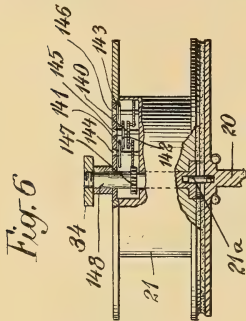
C. K. FANKHAUSER & A. M. McCRILLIS.
TELEPHONE.

APPLICATION FILED JUNE 8, 1911.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 5.

1,237,496.



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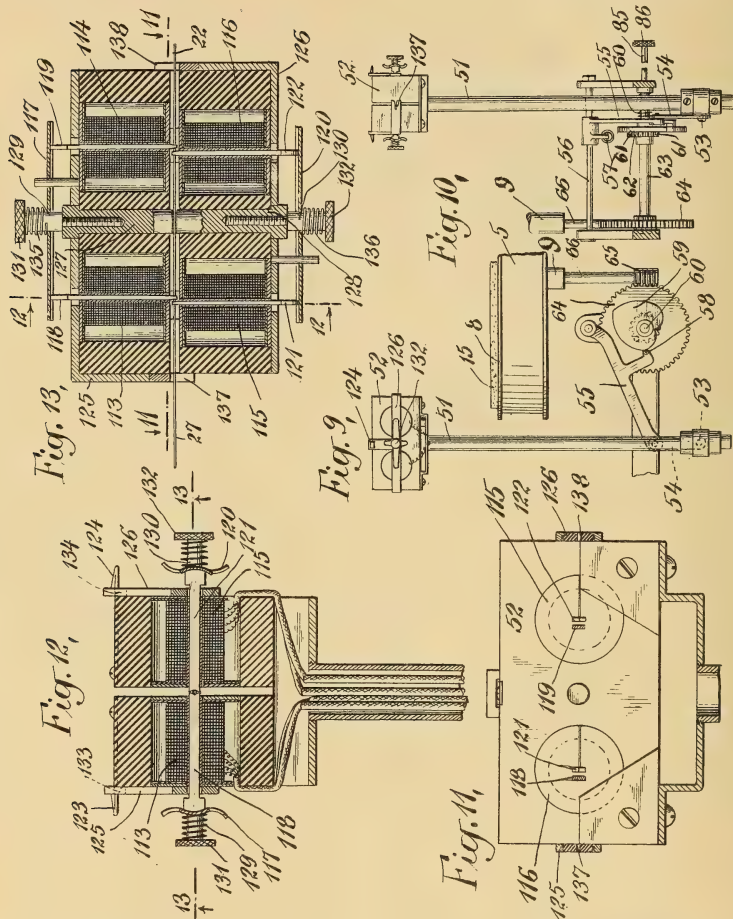
C. K. FANKHAUSER & A. M. McCRILLIS.
TELEGRAPHONE.

APPLICATION FILED JUNE 8, 1911.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 6.

1,237,496.



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UNITED STATES PATENT OFFICE.

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TELEGRAPHONE.

1,237,496.

Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed June 8, 1911. Serial No. 631,887.

To all whom it may concern:

Be it known that we, CHARLES K. FANKHAUSER and ARTHUR M. McCRILLIS, citizens of the United States, the former a resident of Marietta, county of Washington, and State of Ohio, and the latter a resident of Providence, county of Providence, and State of Rhode Island, have jointly invented certain new and useful Improvements in Telegraphones, of which the following is a specification.

Our invention relates to telegraphones, and various objects of our invention are to provide especially efficient and simple means whereby the machine may be automatically stopped at any point desired, and may be automatically stopped to prevent either one of the reels from entirely unwinding; to provide more suitable and efficient means for indicating the amount of the recording body upon the reels; to provide simple and efficient means for locking the reels upon the machine, and also for preventing the reels from unwinding when they are removed from the machine, and to provide an arrangement for obtaining more even speed of the recording body.

Further objects, features and advantages will more clearly appear from the detailed description given below, taken in connection with the accompanying drawings, which form a part of this specification.

In the various figures of the drawings some parts have been omitted for the sake of clearness. In the drawings, Figure 1, is a side view of the main parts of a telegraphone apparatus, embodying our improvements, in one form. Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1. Fig. 3 is a plan view of the parts shown in Fig. 1, the cover of the wooden case being removed. Fig. 4 is a detailed view of the two reels upon which the recording body is wound, together with the removable frame, and handle therefor, and automatic locking means. Fig. 5 is a detailed view of substantially the same parts as shown in Fig. 4, but taken at right angles thereto, and including the movable talking head. Fig. 6 is a side view of one of the reels, showing in detail the special mechanism therein. Fig. 7 is a detailed view showing the working parts of our improved indicator, and automatic stop mechanism. Fig. 8 is a vertical section

taken substantially on line 8—8 of Fig. 7. Fig. 9 is a detailed view showing the operating mechanism for moving the talking head. Fig. 10 is a similar view taken at right angles to Fig. 9. Fig. 11 is a vertical section of a talking head, taken on the line 11—11, of Fig. 13. Fig. 12 is a transverse section of the talking head taken on the line 12—12 of Fig. 13. Fig. 13 is a detailed transverse section through the talking head, taken substantially on the line 13—13 of Fig. 12.

Referring to the various figures of the drawings, and more especially to Fig. 1, 1 represents suitable frame work for carrying and holding the various parts in operative position. 2 represents an electric motor which drives a shaft 3, which in turn drives a pulley 4, over which passes a belt 5. The belt 5 passes about the pulley 4, around two idler pulleys 6 and 7, and about a pulley 8 secured to a shaft 9 (see Fig. 2). Thus upon the rotating of the motor, the pulley 4 is driven, and from this by means of the belt 5, the pulley 8 is driven. The belt 5 may be tightened by adjustably setting an arm 10 (see Fig. 2) which arm is pivotally mounted at 11, and carries a set screw 12, operating in a slot 13. The arm 10 also carries the journal pin 14 of the pulley 6, so that upon moving the arm 10 and adjusting it in position by means of the set screw 12, the belt 5 may be properly tightened.

Secured to the tops of the pulleys 4 and 8, is suitable friction material 15, and rotating loosely above the material 15 and pulley 4, is a circular disk 16. The disk 16 carries a hub 17^a rigid therewith. The hub 17^a is slidably mounted upon, but otherwise keyed to a shaft 17, so as to turn the shaft 17. The shaft 17 is suitably journaled in the frame and has secured to its top, a friction disk 17^b which frictionally engages the underneath side of the reel 18 to drive the same. Thus, if the disk 16 is allowed to rest upon the friction material 15, the latter will drive the disk 16, which in turn will drive the shaft 17 through the keyed hub 17^a, which will in turn drive the reel 18 through the friction disk 17^b. Likewise, above the friction material 15, on the pulley 8, is a circular disk 19, concentrically mounted. The disk 19 is free to revolve independently of the pulley 8, except when the disk 19 is in engagement with the material 15.

When so in engagement the material 15 drives the disk 19, the hub 20^a of which is keyed to the shaft 20, which in turn drives the reel 21, as described in connection with the reel 18. The reels 18 and 21 are designed to carry the recording body 22.

When it is desired that the recording body be wound upon the reel 18, the disk 19 is raised away from the friction material 15, so that the motor 2 directly drives the reel 18, and the reel 21 merely follows by the pull of the recording body. If it is desired to reverse the operation, and wind the recording body upon the reel 21, the disk 16 is raised away from the material 15, whereupon the reel 21 is positively driven from the motor 2, through the belt 5, pulley 8, friction material 15, and disk 19, and the reel 18 is caused to follow merely by the pull of the recording body.

For raising the disk 16 away from the material 15, there is provided a magnet 23, which operates upon an armature 24, normally held away from the magnet 23, by means of the spring 25. The armature 24 carries a forked member 26, which engages under a boss 27, on the shaft 17, so that upon the attraction of the armature 24 by the magnet 23, the armature 24 turns on its pivot 28, thereby causing the forked member 26, to engage the boss 27 and raise the hub 17^a, so that the disk 16 is raised away from the friction material 15. The shaft 17, as above stated, drives the reel 18, but is keyed or otherwise slidably mounted with respect to the hub 17^a, to permit the raising of the disk 16. If the reel 21 is being positively driven, and the disk 16 is raised, the disk 16 will nevertheless be rotated by the following of the reel 18, but in the opposite direction from that in which it would rotate if the reel 18 were being positively driven from the motor. The spring 25 normally forces the friction disks 15 and 16 into engagement with each other and since the spring tension is practically constant the amount of friction between the disks for driving is practically constant.

In a similar manner there is provided an electromagnet 29, which is designed to attract an armature 30, pivotally mounted at 31, carrying a forked member at 32, engaging a boss 33, on the shaft 20, so that upon energizing the magnet 29, the armature 30 is attracted, thereby raising the hub 20^a, and with it the disk 19, away from the friction material 15, so that the pulley 8 is free to revolve without in any way driving or hindering the disk 19. Under these circumstances, if the reel 18 is being positively driven, the reel 21 will follow, and cause rotation of the disk 19, but in the opposite direction to the rotation of the pulley 8.

If both magnets 23 and 29 are deenergized, the motor 2 is also deenergized by

opening the circuit in any well known manner, and the friction material 15 brakes both reels, so that the reels will remain stationary, or will immediately come to a standstill, if they are rotating. If, however, the magnet 23 is energized, and the motor put in operation, the belt 5 will drive the pulley 8, which in turn will positively drive the reel 21, so that the recording body 22 will be coiled upon the reel 21, and unwound from the reel 18. If, on the other hand, the magnet 29 be energized and the magnet 23, deenergized, the motor 2 will positively drive the reel 18, and the reel 21 will be free to rotate in the opposite direction, whereby it will follow by the pulling of the recording body 22.

The reels 18 and 21 are carried by a suitable frame 34 provided with suitable axles for the reels, which is removable from the rest of the apparatus, so that upon removing the frame 34, the reels 18 and 21 are carried with it. The reels 18 and 21, when placed upon the machine are centered by projections 21^a extending from the shafts 17 and 20 (see Fig. 6).

35 represents a handle which is removable from the frame 34. The handle 35 may be used to carry the reels 18 and 21, from one machine to another, or from place to place.

Referring to Fig. 4, one end of the handle carries a fixed hook 36 adapted to engage a pin 37 in the frame 34, as clearly shown in the drawings. The hook 36 also extends through the frame 34 and presses downward a resilient member 38, which carries on its inner end, a piece of friction material 39. The member 38 is pivotally mounted at 40. When the lug or hook 36 forces downward the member 38, the friction material 39 is pressed into engagement with the top of the reel 18, thereby preventing the reel from rotating, and preventing the recording body from unwinding therefrom, while the reel is being moved from place to place. A spring 41 acts upon the other end of the member 38, so that when the handle 35 is removed from the frame 34, the other end carrying the friction material 39, is raised out of engagement with the top of the reel 18. The other end of the handle 35 carries a hook 42, pivotally mounted at 43, and having an integral operating finger 44, held in its normal position by a spring 45. The hook lug 42 engages underneath a pin 46, to lock the handle into engagement with the frame 34. The hook lug 42 when thus in engagement, also presses downwardly a member 47, which carries on its inner end, a piece of friction material 48. Thus the end of the hook lug 42 forces the friction material 48 into engagement with the top of the reel 21, so as to prevent the same from rotation when the handle is in place, and the reels are being removed from

the machine, or carried from place to place. The member 47 is pivoted at 49, and a spring 50 engages the other end of the member 47, to force the inner end carrying the friction material 48, away from the reel 21, when the handle is removed from the frame 34, so that when the handle is thus removed both reels are freely rotatable.

Slidably mounted in the frame is a reciprocating rod 51 (see Fig. 1) which carries on its upper end the talking head 52. By reciprocating up and down the rod 51, the talking head is given a reciprocating movement, so that the recording body 22 is guided evenly over the reels. For the purpose of producing this reciprocating movement, there is pivotally connected to the lower end of the rod 51 at 53, a link 54, which link is pivotally connected to an arm 55 (see more especially Figs. 9 and 10). The arm 55 is pivotally mounted on a shaft 56, and is held in a downward position by means of a spring 57. The arm 55 carries a cam roller 58, which is operated upon by a cam 59, rigidly secured to a shaft 60 (see Fig. 8). The cam 59 carries pins 61 adapted to interlock between teeth of a member 62, rigidly secured to a shaft 63. The shaft 63 carries fixed thereto a gear 64, and a worm 65 on a shaft 66 meshes therewith. The shaft 66 is in fixed connection with the shaft 9 of the pulley 8, so that as the pulley 8 is driven, shaft 66 is rotated, thereby rotating the worm 65, which turns the gear 64, rotating shaft 63, and through the interlocking engagement of the member 62 and pins 61, rotates the heartshaped cam 59, which operates upon the arm 55, to raise and lower the talking head, so as to properly distribute the turns or coils of the recording body 22 upon the reels 18 or 21, as the case may be. A spring 67 normally operates upon the heartshaped cam 59, to hold the pins into interlocking engagement with the member 62.

In order that the amount of recording body wound upon the reel 21 may be properly indicated upon the machine itself, we provide a rod 68, suitably journaled in the frame of the machine (see Fig. 1). The rod 68 has secured to its upper end, an arm 69, which carries at its outer end, a follower 70, which follower has on its inner face a pad of suitable soft material, such as leather or the like, 71. Also suitably journaled in the frame of the machine is a rack 72 (see also Fig. 2) which rack carries an upwardly projecting socket 73, having a slot 74 therein. The shaft 68 carries a pin 75 adapted to enter the slot 74, in order to interlock the shaft 68 with the rack 72, so that when the shaft 68 is turned, the rack 72 will be turned. A spring 76 acting between the frame and the rack 72, normally tends to rotate the shaft 68 and the arm 69, so as to

force the follower 70 into engagement with the coils upon the reel 21. A spring 77, acting between the frame and a boss 78, on the shaft 68, normally forces downward the shaft 68, so as to hold the pin 75 within the slot 74. If it is desired to move the follower 70 outwardly, so as to remove the reels from the machine, it is only necessary to pull up the arm 69, and with it the shaft 68, against the action of the spring 77, until the pin 75 is withdrawn from the slot 74, when the arm 69 may be moved outwardly without affecting or moving the rack 72. When the arm 69 is thus moved outwardly, the reels may be removed from the apparatus without hindrance.

The rack 72 engages a pinion 79, which is secured to a shaft suitably journaled in the frame (see also Fig. 8). This shaft carries at its other end, a beveled pinion 80, which meshes with a beveled pinion 81, secured to shaft 82, suitably journaled in the frame. The shaft 82 has secured to its outer end a pointer 83, which coöperates with an indicating dial 84. Thus, as the radius of the coils upon the reel 21, varies in accordance with the amount of the recording body thereupon, the follower 70 is moved outwardly or inwardly, thereby rotating the shaft 68 and rack 72 which, acting through the pinions 79, 80 and 81, rotates the arm 83, so that it indicates on the dial the amount of recording body upon the reel 21, or removed from the reel 18.

The shaft 82 is hollow, and has loosely passing therethrough, a pin 85, having fixedly secured to its outer end, a thumb head 86. At its other end the pin 85 is screwed into the shaft 60 at 87, so that upon taking hold of the thumb piece 86, and pulling the same outwardly, the shaft 60 is pulled outwardly against the action of the spring 67, thereby removing the pins 61 from locking engagement with the member 62, so that the cam 59 may be turned to any desired position, to adjust the position of the talking head, without movement of the driving mechanism which reciprocates the talking head.

In order that the apparatus may be automatically stopped at some predetermined point, to prevent the recording body from being entirely withdrawn or unwound from one or the other of the reels, we provide the shaft 82, with a member 88 fixed thereto, which member carries a pin 89 (see also Fig. 7). The pin 89 is so arranged that when the pointer 83 is at zero it will force an electrical switching member 90, into connection with a member 91, as shown in Fig. 7, so as to close an electrical circuit, which may be utilized in any suitable or well known manner, to shut off current from the motor to stop the apparatus. Thus, if the recording body is being rewound after a

record has been placed thereupon, the operator may start the rewinding, and leave the apparatus to itself, and when the pointer reaches zero, or the starting point, the apparatus will automatically stop. The apparatus may be so designed that at zero there will be a sufficient amount of recording body left upon each reel. When winding in the other direction, and the arm 83 rotates about the dial, the pin 89 will strike the opposite side of the switching member 90, and force it into electrical connection with a member 92, so as to close the same, or another electrical circuit, to automatically stop the apparatus, when the pointer 83 reaches zero in the opposite direction. These two features prevent the recording body from being entirely unwound from either reel. In order that the apparatus may be automatically stopped at any point, with respect to the position of the recording body, we provide a hand or adjustable member 93, suitably journaled in the insulating dial 84, as shown in Fig. 8. The member 93 is placed into electrical connection with an electrical circuit, by means of a member 94, screwed to the dial 84, but which has its free end 95, bearing with a spring pressure upon the metal of the hub of the member 93. The member 93 is provided with an upturned finger 96, so that when the hand 83 rotates far enough, it will engage the finger 96, and thus close an electrical circuit through the frame and operating parts of the machine, and the member 94, which electrical circuit is utilized to disconnect the motor in any suitable or well known manner. Since this member 93 is freely adjustable in any position on the dial, it may be set in any position, and thus the apparatus may be stopped automatically in any position or stage of operation at which the recording body may be. This is of advantage, as the recording body may be used for recording a number of records, and it may be desired to indicate the point at which one record stops, and another record begins, and it may be desired to have the machine automatically stopped at this point. This is done merely by setting the hand 93 at this point on the dial, when the machine will automatically stop at that point.

It will be seen that if the motor 2 rotates at a constant speed, then as the diameter or radius of the coil of the recording body varies, the speed of the recording body will vary. In order to overcome this we provide a rheostat 97, with contact points 98, over which slides a movable contact finger 99. The finger 99 is carried by an arm 100, integrally connected with the rack 72, so that as the follower 70 moves outwardly, the arm 100 is rotated to operate the rheostat 97, to throw more resistance in series with the motor 2, to decrease its speed, so that as

the radius of the coil upon the positively driven reel 21 increases, the speed of the motor will decrease, in order to keep the speed of the recording body substantially constant.

For the purpose of locking the removable frame 34, with its reels 18 and 21, to the main frame of the machine, we provide a pivoted hook member 101, pivoted to the main frame of the machine at 102. (See Figs. 4 and 5). The member 101 is resiliently held against a stop 103, by a spring 104. The hook 105 of the member 101 is designed to extend upwardly into a tube 106, carried by the frame 34. Pivoted within the tube 106, at 107, is a hook member 108, resiliently held against a stop 109, fixed in the tube 106 by means of a spring 110. It will thus be seen that as the frame 34 is forced downwardly on to the machine, the hooks 105 and 108 will snap into engagement with one another, and thus lock the frame 34 to the main parts of the machine. If it is desired to remove the frame at any stage of operation, it is only necessary for the operator to press the hook member 108 against the action of the spring 110, in order to unlock the same and then remove the frame 34, with its spools. However, it will be seen that otherwise, and at most times during the operation of the machine the frame 34 is positively locked to the main frame in order to prevent the reels being removed. However, it is desirable that the reels be removed at a particular stage in the operation of the machine, as when the last coil or turn of the recording body is at the top or bottom of the reels. As shown herein we have provided means for automatically unlocking the frame 34 when the last turn of the recording body is at the top of the reels. For this purpose we secure to the reciprocating rod 51, carrying the talking head 52, an arm 111 which in its upward movement engages a cam face 112 on the member 101. The arm 111 is so positioned and timed that when the talking head reaches its uppermost position the arm 111 will have engaged the cam face 112, and moved the member 101, so as to disengage the hook 105 from the member 108, to unlock the frame 34 from the main frame of the machine. Thus at this certain predetermined stage in the operation of the machine, and at this certain predetermined position of the recording body, with respect to the reels, the reels may be removed without hindrance. At other stages however, the reels and the movable frame are locked to the machine, and can only be removed by the operator forcing the member 108 against the action of the spring 110.

The talking head 52 has secured therein two pairs of electromagnets 113, 114; 115 and 116 (see Figs. 11, 12 and 13). Carried

by and fixedly secured to a member 117, are two pole pieces 118 and 119, which are slidably mounted through the center of the electromagnets 113 and 114. Carried by and
 5 fixedly secured to a member 120, are two pole pieces 121 and 122, which are slidably mounted through the center of the electromagnets 115 and 116. These pole pieces 118, 119, 121 and 122, are suitably cut away at
 10 their inner ends, as shown in Figs. 12 and 13, so as to suitably engage the recording body 22. Secured to the top of the talking head by screws, are two spring members 123 and 124, having bent over heads at their outer
 15 ends (see Figs. 3 and 12). Extending about one side of the talking head is a loose frame 125, and extending about the other side of the talking head is a loose frame 126. The frame 125 is designed to be held in engage-
 20 ment with the talking head, by being snapped over the head of the spring member 123. In a similar manner the frame 126 is designed to be held in rigid engagement with the talking head, by being snapped over the
 25 head of the spring member 124. In order that the frames 125 and 126 may be held in suitable sliding engagement with the talking head, they are secured to members or pins 127 and 128, respectively. The pins or mem-
 30 bers 127 and 128 have screwed thereto studs 129 and 130, respectively, which studs carry heads 131 and 132. Thus, by pushing in on the heads 131 and 132 the frames 125 and 126 are carried inwardly until the apertures 133 and 134 (see Fig. 12) therein, snap over
 35 the heads of the spring members 123 and 124, to hold the frames 125 and 126 into rigid and close engagement with the talking head. Encircling the studs 129 and 130 are springs 135 and 136, respectively, which ex-
 40 ert a spring action between the heads 131 and 132, and the members 117 and 120 respectively, so as to force the members 117 and 120 inwardly, thus carrying the mem-
 45 bers or pole pieces 118, 119, 121 and 122, inwardly into proper engagement with the recording body 22. For this purpose the frames 125 and 126 are provided with suitable apertures through which the pole pieces 118, 119, 121 and 122, pass. The removable
 50 frames 125 and 126 are slotted as at 137 and 138 (see Figs. 10, 11 and 13) respectively, through which slots the recording body 22 passes. When it is desired to re-
 55 move the reels 18 and 21, with the recording body 22, and in order to release the talking head therefrom the spring members 123 and 124 are pressed downwardly so as to release the movable frames 125 and 126, allowing the
 60 heads 131 and 132 to be pulled outwardly, thereby pulling outwardly not only the frames 125 and 126, but also the pole pieces which are resiliently held upon frames 125 and 126. The above forms an especially simple and
 65 efficient arrangement for the talking head.

whereby the pole pieces and guiding apparatus of the recording body are easily removed to disconnect the recording body from the talking head.

We also provide suitable means for indi-
 70 cating the amount of recording body on one or both of the reels whether or not the reels are on or off of the machine. Thus when the reels and recording body are taken from the machine, the indicator at 83 is no longer
 75 present to give the correct or proper indications. To provide for this we place within the reel 21, suitable indicator gearing 140, operating indicator dials 141, 142 and 143, the figures upon the faces of which appear
 80 through apertures 144, 145 and 146 in the top of the reel. (See Figs. 3 and 6). The gearing 140 which moves around with and is carried by the reel 21 is primarily oper-
 85 ated by a gear 147 fixed to the shaft 148, which is held stationary with the removable frame 34. Thus as the reel 21 turns to wind up or unwind the recording body, the length
 90 of body so wound up or unwound is indicated by the dials 141, 142 and 143, and this whether the reels are on the machine or not, and this indicating mechanism may be set so
 95 that it will always indicate the amount of body on the reel 21.

Although we have described our improve-
 100 ments in great detail, nevertheless we do not desire to be limited thereto, except as clearly specified in the appended claims, since many changes and modifications may well be made without departing from the spirit and
 105 scope of our invention, in its broadest aspects. However, having fully and clearly described our improvements, what we claim as new, and desire to secure by Letters
 110 Patent, is:

1. In a machine of the class described, the combination of a recording body, a reel upon which said body is coiled, an indicator, and means for operating said indicator respon-
 115 sive to variations in the radius of the coil of recording body upon said reel, said means embracing a pivoted follower, resilient means for maintaining the follower against the periphery of said coil and gearing oper-
 120 ated by said follower and in turn operating said indicator.

2. In a machine of the class described, a recording body, a reel upon which said body is wound, a main frame for the machine, a frame for holding said reel and removable
 125 from the main frame, an indicator, and a cooperating device, one being on said reel and the other on said removable frame, said device cooperating with said indicator to actuate the indicator to indicate the amount
 130 of body on said reel.

3. In a machine of the class described, a recording body, a reel upon which said body is wound, operating mechanism, a main frame for the machine carrying said oper-
 135

ating mechanism, a frame for holding said reel and removable from the main frame, and an indicator on said reel to indicate the amount of body on said reel.

4. In a machine of the class described, a recording body, a reel upon which said body is wound, a main frame for the machine, a frame for holding said reel and removable from the main frame, and an indicator for indicating the amount of body on said reel, said indicator having part of its operating parts on said reel and part on said removable frame.

5. In a machine of the class described, a recording body, two reels upon which said body is wound, a suitable framework for the machine, a frame for holding said two reels and removing them from said first mentioned frame, and an indicator for indicating the amount of body on one of said reels, said indicator having part of its operating parts on one of said reels and part on said removable frame.

6. In a machine of the class described, a recording body, two reels upon which said body is wound, a frame for carrying said reels, a removable handle for said frame, and means whereby when said handle is in position on said frame the reels are held stationary with respect to said frame.

7. In a machine of the class described, a recording body, two reels upon which said body is wound, a frame for carrying said reels, a removable handle for said frame, and means whereby when said handle is in position on said frame, the reels are held stationary with respect to said frame, said means including movable members on said frame and means on said handle for causing said members to engage said reels to lock the reels.

8. In a machine of the class described, a recording body, two reels upon which said body is wound, a frame for carrying said reels, a removable handle for said frame, and means whereby when said handle is in position on said frame the reels are held stationary with respect to said frame, said means including a braking member for each reel resiliently held in inoperative position and means on said handle for throwing said members into operative position.

9. In a machine of the class described, a recording body, a reel upon which said body is wound, a frame for carrying said reel, a removable handle for said frame, means for preventing the unwinding of said reel, and means on said handle for throwing said last mentioned means into operation.

10. In a machine of the class described, a recording body, two reels upon which said body is wound, a main frame for the machine, a removable frame for carrying said

reels, a removable handle for said removable frame, and means whereby when said handle is in position on said frame the reels are held stationary with respect to said frame, said means embracing means for preventing said reels from rotating with respect to said removable frame and means on said handle for throwing said last mentioned means into operation.

11. In a machine of the class described, a recording body, two reels on which said body is wound, a main frame, a removable frame carrying said reels, means for locking said removable frame to the main frame, and means for automatically unlocking said locking means at a predetermined stage in the operation of the machine.

12. In a machine of the class described, a recording body, two reels on which said body is wound, a main frame, a removable frame carrying said reels, means for locking said removable frame to the main frame, a movable talking head, and means actuated responsive to movement of the talking head, for unlocking said removable frame when the talking head reaches approximately one end of its path of travel.

13. In a machine of the class described, a recording body, a main frame, a reel removable from said frame on which reel said body is wound, means for holding said reel to said main frame, and means for automatically releasing said holding means at a predetermined stage in the operation of the machine.

14. In a machine of the class described, a recording body, a main frame, a movable talking head, a reel removable from said frame on which reel said body is wound, means for holding said reel to said main frame, and means for automatically releasing said holding means at a predetermined stage in the operation of the machine, said releasing means being actuated by the movement of the talking head.

15. In a machine of the class described, a recording body, a reel upon which said body is wound, means for driving said reel, and means for varying the speed of said reel as the amount of body on said reel increases or decreases.

16. In a machine of the class described, a recording body, a reel upon which said body is coiled, an electric motor for driving said reel, means for varying the electrical condition of said motor to maintain the speed of the body substantially constant, and means for controlling said last mentioned means responsive to variations in the radius of the coil of body on said reel.

17. In a machine of the class described, a recording body, a reel upon which said body is wound, means for driving said reel, and means for varying the speed of said reel as

the amount of body on said reel increases or decreases, said last mentioned means embracing a follower bearing against the periphery of the coil of recording body on the reel, and an electrical circuit, the condition of which is varied by the movement of said follower.

18. In a machine of the class described, a recording body, two reels upon which said body is wound, means for driving said reels in either direction to unwind the body from one reel and wind it upon the other and vice versa, means actuated by variations in the radius of the recording body on one of said reels, and means controlled by said last mentioned means for varying the driving speed of the reels so that the speed with which the body passes from one reel to the other will remain substantially constant irrespective of variations in the radius of the coil of body on the reels.

19. In a machine of the class described, a recording body, a talking head therefor, and means for moving the recording body with respect to the talking head, said talking head embracing an electro-magnet, a frame supporting said magnet, a frame removably attached to said first mentioned frame, a pole piece and means on said removable frame, and removable therewith for resiliently holding said pole piece in position.

20. In a machine of the class described, a recording body, a talking head therefor, and means for moving the recording body with respect to the talking head, said talking head embracing a plurality of electromagnets and corresponding pole pieces, a frame supporting said magnets, a second frame, a

clamp for removably attaching said second frame to said first frame and means on said removable frame for resiliently holding said pole pieces in operative position with respect to said recording body.

21. In a machine of the class described, a recording body, a talking head therefor, and means for moving the recording body with respect to the talking head, said talking head embracing two sets of pole pieces and electromagnets therefor, a frame for supporting said magnets, two frames, one for each set of pole pieces, and each removably clamped to said first frame, and resilient means operating between each removable frame and its set of pole pieces for holding said pole pieces in position, with respect to said recording body.

22. In a machine of the class described, a recording body, a talking head therefor, and means for moving the recording body with respect to the talking head, said talking head embracing an electromagnet, a frame supporting said magnet, a frame removably attached to said first mentioned frame, a pole piece and a spring acting between said removable frame and said pole piece for holding the pole piece in operative position with respect to said recording body.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

CHARLES K. FANKHAUSER.
ARTHUR M. McCRILLIS.

Witnesses:

WILLIAM F. DE DREUX,
H. A. BROOKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND MODULATING DEVICES

1,237,813 ----- J. U. Poirier,
Patented - Aug. 21, 1917,
Filed - Jan. 19, 1917.

J. U. POIRIER.
SOUND MODULATING DEVICE.
APPLICATION FILED JAN. 19, 1917.

1,237,813.

Patented Aug. 21, 1917.
2 SHEETS-SHEET 1.

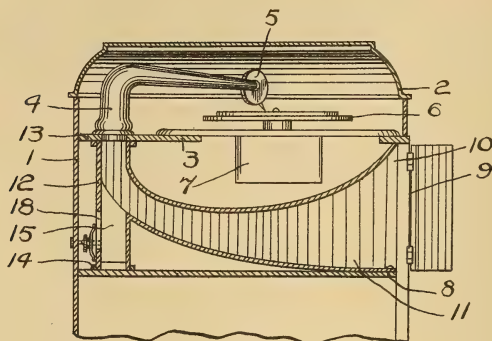


FIG. 1.

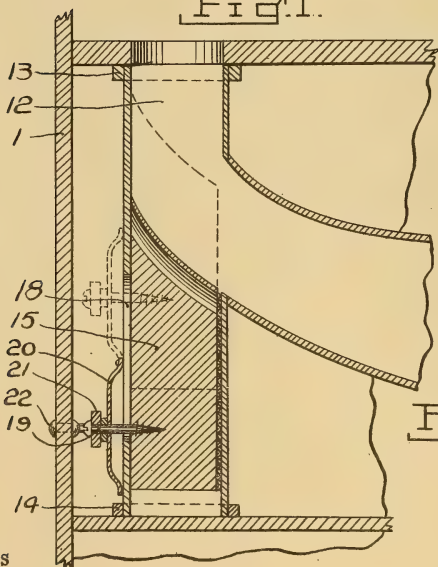


FIG. 2.

WITNESSES

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SOUND MODULATING DEVICE.
APPLICATION FILED JAN. 19, 1917.

1,237,813.

Patented Aug. 21, 1917.

2 SHEETS—SHEET 2.

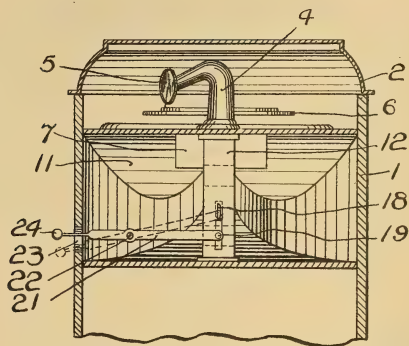


FIG. 3.

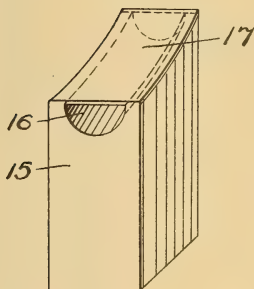


FIG. 4.

WITNESSES

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SOUND-MODULATING DEVICE.

1,237,813.

Specification of Letters Patent.

Patented Aug. 21, 1917.

Application filed January 19, 1917. Serial No. 143,306.

To all whom it may concern:

Be it known that I, JOSEPH ULDERIC POIRIER, a subject of the King of Great Britain, and residing at 818 St. Hubert street, in the city of Montreal, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Sound-Modulating Devices; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention relates to improvements in sound modulating devices for phonographs.

The object of the invention is to modulate the volume of the sound at will by a cheap, simple and efficient device, and whereby the quality of the sound will not be affected, owing to the special construction of the plunger, or modulating member.

Another object of the invention is to prevent the vibrations from being abruptly interrupted and deflected backwardly to interfere with on-coming vibrations when they strike the plunger, and this object is attained by the particular inclination given to the working face of the said plunger. A further object of the invention is to make the said plunger, in connection with the sound amplifying device, resonant, in order to cause the said plunger to vibrate in sympathy with the vibrations of the sound amplifier.

In the drawings, Figure 1 illustrates a vertical section through the top portion of a phonograph of the cabinet type, provided with a concealed sound amplifier, showing the modulating device applied thereto.

Fig. 2 is an enlarged vertical section through a portion of the phonograph casing, showing a portion of the casing and the sound amplifier, and the plunger suitably secured within its casing.

Fig. 3 is a vertical section through a portion of the cabinet of the casing of a phonograph, showing a rear view of the sound amplifier and modulating attachment.

Fig. 4 is an enlarged perspective view of the plunger or modulating member.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, 1 is the casing of a talking machine, and 2 is the hinged

housing or cover. 3 is the top partition, secured below said cover, on which is mounted the swinging tone arm 4 provided with a reproducer 5. 6 is a turntable actuated by the usual motor 7.

Below the said partition 3, at a suitable distance, is provided a second or bottom partition 8, and 9 are doors to close the opening 10. Between the partitions 8 and 3 is suitably secured the sound amplifier 11, suitably curved in order to avoid contact with the motor 7, and provided at its smaller end with a vertical sound conductor 12 which is preferably secured at its inner or upper end to the under side of the partition 3 by the blocks 13, the said inner or upper end of said sound conductor communicating with the tone arm 4, the lower or outer end of said sound conductor being rigidly secured to the partition 8 by means of the blocks 14.

The said sound amplifier 11 is preferably connected to said sound conductor 12 at an angle, and the sound conductor 12 is preferably rectangular in cross-section and hollow through and through and made of the same material as the sound amplifier and integral therewith. The sound conductor 12, however, could be made circular or oval if found convenient, without, it will be understood, departing from the spirit of the invention.

Within said hollow sound conductor 12, is provided a plunger 15, preferably longer than wide, the upper end of said plunger being inclined at an angle corresponding to the angle of the sound amplifier 11, so that when the said plunger 15 is in its normal position it will come flush with the bottom of the said sound amplifier and will form a continuation of the amplifier.

The top portion of said plunger 15 is provided with a transverse cavity or channel 16 which is covered by a curved plate 17, which is preferably made of the same material as the sound conductor 12 and the sound amplifier 11, in order that the vibrations caused by the air conducted through the said sound conductor may synchronize with the vibrations in the sound amplifier.

The rear wall of the sound conductor 12

is provided at its lower or outer end with a longitudinal slot 18, and 19 is a screw secured to the lower end of said plunger 15 and projecting through said slot 18. 20 is a spring mounted on the outer projecting end of said screw 19, adapted to press outwardly on said screw in order to hold tight the plunger 15 in adjusted position within said sound conductor 12.

21 is a rod fulcrumed at 22 to the rear wall of the casing 1 and pivotally connected at its inner end to the screw 19. The said rod 21 projects through an elongated opening 23 in one side of the casing 1 and terminates in a handle 24.

In the operation of the modulating device, it will readily be seen that in order to reduce the volume of tone without in any way impairing or interrupting the sound waves which are set into vibration by the reproducer, the handle 24 of the rod 21 is pressed downward, thus raising the plunger 15 so that its upper end is caused to project into the amplifier, thus reducing the sound outlet in the sound conductor 12. The result is that the waves, on striking the curved surface, will not be abruptly interrupted and deflected backward but will simply deviate in their course into the sound amplifier 11, thus considerably reducing the resonance of the sound without altering any of its particular properties.

Such is not the case with the modulating devices which consist of a plate introduced through the sound conductor at right angles to the direction of movement of the sound waves. These devices will reduce the sound, but the waves which strike against the said plate will be abruptly deflected and will interfere with the on-coming waves.

Another important feature of this invention consists in the particular construction of the plunger 15 which is provided with the elongated channel 16 covered by the plate 17. When the sound waves strike the plate 17 of the plunger, an equivalent resonance and similar vibrations to those of the amplifier will be obtained. Thus it will readily be seen that the quality of the tone will not be impaired in any way.

The said plunger can be covered around its sides with felt or any other suitable material, in order that it will fit snugly within the sound conductor 12, and thus prevent the said plunger member from vibrating within said conductor.

What I claim is:—

1. In a talking machine, the combination, with a tone arm, and a sound conduit leading thereto; of an amplifier opening at an angle into the sound conduit; and a modulator movable bodily across the opening in said amplifier and having a deflecting sur-

face which is definitely disposed at an acute angle to the axis of the sound conduit, whereby, when the modulator is projected across said opening, a tapered restriction is formed between the walls of the sound conduit and the deflecting surface of the modulator.

2. In a talking machine, the combination, with a tone arm, and a vertical sound conduit leading thereto at its inner end; of an amplifier opening at an angle into the sound conduit between the ends of the latter; and a modulator slidable axially in said sound conduit and having a deflecting surface at its upper end which is disposed at an acute angle to the axis of the sound conduit; said modulator being normally disposed in the lower portion of the sound conduit, but movable upwardly so as to project its upper end across the opening in the amplifier, thereby to form a tapered restriction between the walls of the sound conduit and the deflecting surface of the modulator.

3. In a talking machine, the combination, with a tone arm, and a sound conduit leading thereto at its inner end and having its outer end portion provided with a longitudinal slot; of an amplifier opening at an angle into said sound conduit between the inner end of the same and said slot; a modulator arranged in said sound conduit and having a deflecting surface which is disposed at an acute angle to the axis of the conduit; said modulator being normally disposed in the outer portion of said sound conduit, but movable axially therein to project its deflecting surface across the opening in the amplifier, thereby to form a tapered restriction between the walls of the sound conduit and the deflecting surface of the modulator; a member secured to said modulator and projecting outward through said slot; and an operating device connected to said projecting member to effect the movements of the modulator.

4. In a talking machine, the combination, with a tone arm, and a sound conduit leading thereto; of an amplifier opening at an angle into the sound conduit; and a modulator in said sound conduit provided at one end with a channel, and with a resonant deflecting plate bridging the same and set at an acute angle to the axis of the sound conduit; said modulator being movable in said sound conduit so as to project said plate across the opening in the amplifier, thereby to restrict the passage of the sound waves therethrough.

5. In a talking machine, the combination, with a tone arm, and a sound conduit leading thereto; of an amplifier opening at an angle into the sound conduit; and a modulator in said sound conduit provided at one

end with a channel, and with a resonant
deflecting plate which bridges said channel
and is set at an acute angle to the axis of
the sound conduit; said modulator being
5 slidable axially in said sound conduit so as
to project said plate across the opening in
the amplifier, thereby to form a tapered re-
striction between the walls of the sound con-

duit and the deflecting surface of the modu-
lator.

Signed at Montreal, Quebec, Canada, this 10
13th day of December, 1916.

JOSEPH ULDERIC POIRIER.

Witnesses:

F. A. BEST,

A. P. DEAL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

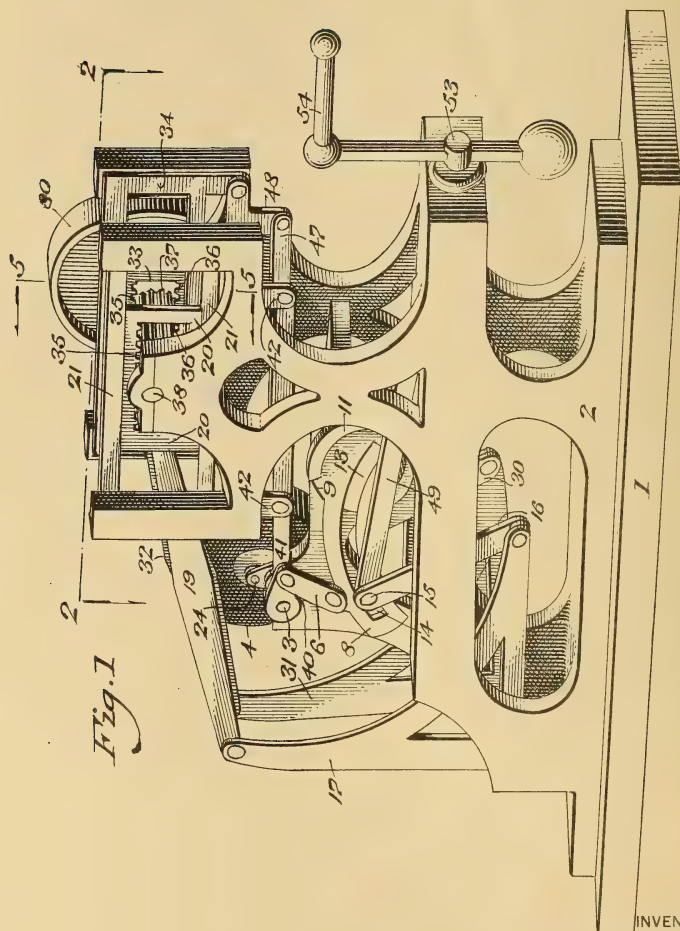
SPEED CHANGING MECHANISM

1,237,910 ----- W. B. Jackson,
Patented - Aug. 21, 1917,
Filed - Mar. 9, 1917.

1,237,910.

W. B. JACKSON.
SPEED CHANGING MECHANISM.
APPLICATION FILED MAR. 9, 1917.

Patented Aug. 21, 1917.
6 SHEETS—SHEET 1.



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SPEED CHANGING MECHANISM.
APPLICATION FILED MAR. 9, 1917.

1,237,910.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 2.

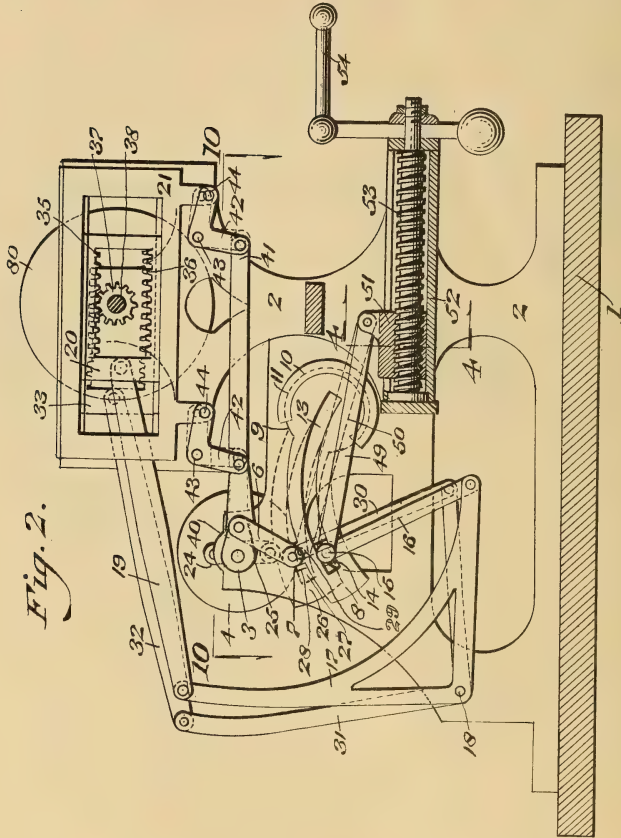


Fig. 2.

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SPEED CHANGING MECHANISM.
APPLICATION FILED MAR. 9, 1917.

Patented Aug. 21, 1917.
6 SHEETS—SHEET 3.

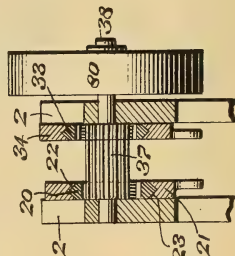
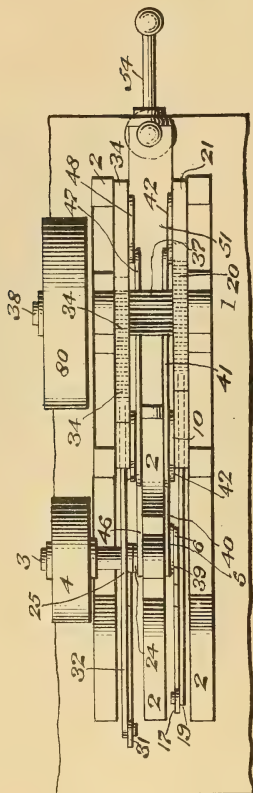
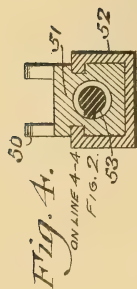


Fig. 3.

Fig. 5.
ON LINE C-C.
FIG. 1.

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SPEED CHANGING MECHANISM.
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1,237,910.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 4.

Fig. 6.

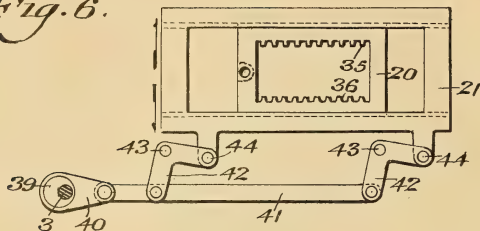
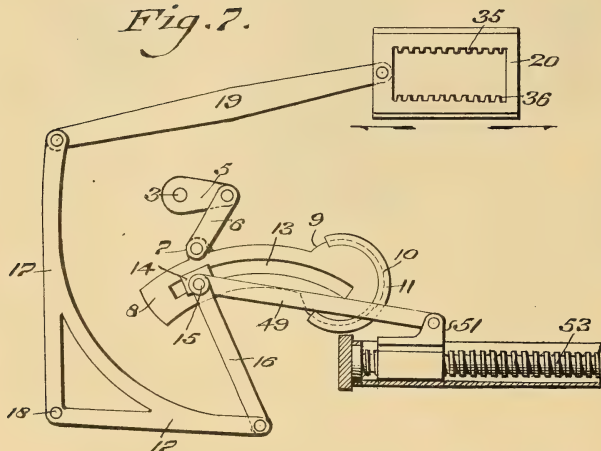


Fig. 7.



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1,237,910.

Patented Aug. 21, 1917.

6 SHEETS—SHEET 5.

Fig. 9.
 ON LINE 9-9, FIG. 8.

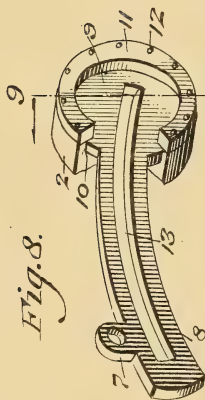
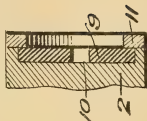


Fig. 10.
 ON LINE 10-10, FIG. 2.

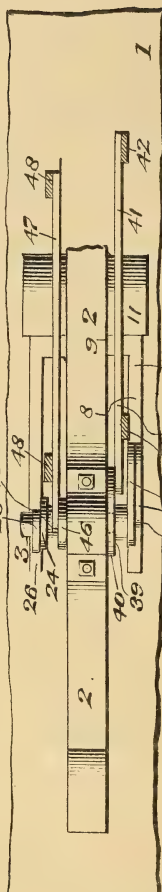
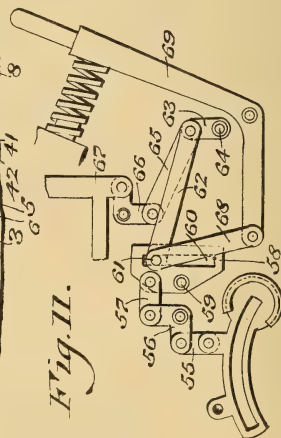


Fig. 11.



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SPEED CHANGING MECHANISM.
APPLICATION FILED MAR. 9, 1917.

Patented Aug. 21, 1917.
6 SHEETS—SHEET 6.

1,237,910.

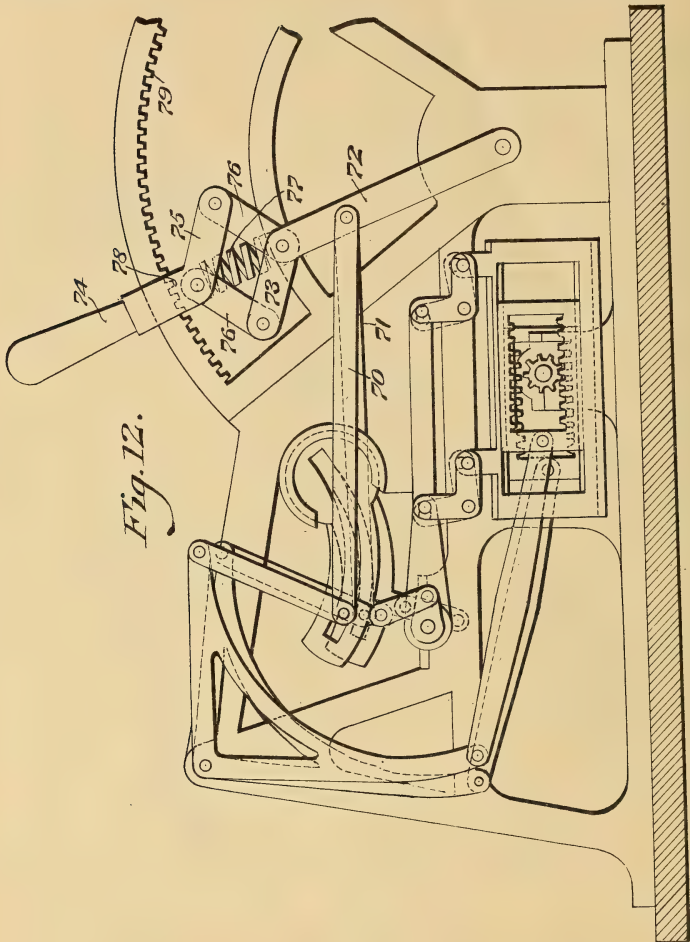


Fig. 12.

INVENTOR

Walter B. Jackson,
BY Hedersheim Gaubants,
ATTORNEYS

UNITED STATES PATENT OFFICE.

WALTER B. JACKSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO HARPER F. SMITH AND ONE-THIRD TO CHARLES H. AUKETT, BOTH OF PHILADELPHIA, PENNSYLVANIA.

SPEED-CHANGING MECHANISM.

1,237,910.

Specification of Letters Patent.

Patented Aug. 21, 1917.

Application filed March 9, 1917. Serial No. 153,625.

To all whom it may concern:

Be it known that I, WALTER B. JACKSON, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Speed-Changing Mechanism, of which the following is a specification.

My present invention consists of a novel speed changing mechanism, wherein novel means are provided for causing the driven element to travel at any desired ratio of speed relative to the driving element.

It further consists of a novel construction of connecting mechanism and novel means to adjust it.

Other novel features of construction and advantage will hereinafter appear in the detailed description and the appended claims.

For the purpose of illustrating my invention, I have shown in the accompanying drawings, typical embodiments thereof which are at present preferred by me, since these embodiments will give in practice satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a perspective view of a speed changing mechanism embodying my invention.

Fig. 2 represents a sectional elevation, the section being taken in part on line 2—2 of Fig. 1.

Fig. 3 represents a top plan view of my device.

Fig. 4 represents a section on line 4—4 of Fig. 2.

Fig. 5 represents a section, substantially on line 5—5 of Fig. 1.

Fig. 6 represents, in detached position and in side elevation, a rack frame and means for raising and lowering it.

Fig. 7 represents, in detached position and in side elevation, a rack frame, its reciprocating means, and its adjusting means.

Fig. 8 represents, in perspective, a portion of the stroke adjusting means,

Fig. 9 represents a section on line 9—9 of Fig. 8.

Fig. 10 represents a section substantially on line 10—10 of Fig. 2, certain parts being omitted for the sake of clearness of illustration.

Fig. 11 represents, in side elevation, another embodiment of my invention.

Fig. 12 represents a sectional elevation of another embodiment of my invention.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—

1 designates a base plate on which is mounted a housing 2, it being understood that in practice, the housing 2 is connected to any type of a support, either stationary or movable, in accordance with the conditions and requirements met with in practice. Journaled in the housing 2 in any desired manner is a driving shaft 3 which is provided with a pulley 4, thereby adapting the driving shaft to be connected to any desired source of power. The driving shaft 3 has secured thereto a crank arm 5, to the end of which is pivotally connected a link 6, which is also pivotally connected to the ear or lug 7 of an arm 8, said link being connected near the forward end of said arm. The rear end of said arm 8 is substantially cylindrical in contour, as indicated at 9, and is rotatable in a recess 10 in the housing 2, and is retained therein by means of a ring-like member 11 secured to the housing by fastening devices 12.

The arm 8 is provided with a curved slot 13 in which is slidable a shoe 14 which carries a pin 15. 16 designates a link, one end of which is pivotally mounted on the pin 15, while its opposite end is connected to an elbow lever 17, which is pivoted at 18, to the housing 2. The other end of the elbow lever 17 has pivotally connected therewith, a connecting rod 19, one end of which is connected to a rack 20 which is slidable in the movably mounted rack frame 21, in any desired manner.

In the form illustrated in Fig. 5, the top and bottom of the rack are each provided with a substantially V-shaped face which cooperates with similar shaped faces on the rack frame, as indicated at 22 and 23,

respectively. A plurality of racks, rack frames, and connections to the driving shaft 3 are employed, which are constructed in a similar manner, but are connected in such a manner that one set has a lead over the other set. Mounted on the driving shaft 3 at an angle of 90° to the crank arm 5 is a crank arm 24 which is connected by means of a link 25 to an arm 26 having one end mounted for rotation in a vertical plane. The arm 26 is provided with a curved slot 27 in which is mounted a shoe 28 which carries a pin 29, to which is connected a link 30, which is also connected to an elbow lever 31 fulcrumed at 18. This elbow lever 31 has connected thereto one end of a connecting rod 32, the other end of which is connected to a rack 33, which is slidable in a rack frame 34 in a similar manner to that already described with respect to the rack 20 and the rack frame 21.

Each of the racks 20 and 33 is provided with an upper and lower set of rack teeth 35 and 36, respectively, which are adapted to alternately engage a gear 37 mounted on a driven shaft 38 journaled in the housing. The shaft 38 is connected in any desired manner to the mechanism to be driven, and in order to illustrate one manner of doing this, the driven shaft 38 is illustrated as being provided with the pulley 80.

I provide means to effect at the proper time the raising and lowering of the rack frames, so that when one frame is raised, another frame will be lowered, so that one or the other of the rack teeth of a rack will be in mesh with the driven gear 37. The driving shaft 3 is provided with an eccentric strap 39, which coöperates with an eccentric rod 40 which is connected to a rod 41, said rod being pivotally connected with bell-crank levers 42 which are fulcrumed at 43 to a fixed support, such as the housing, and which are pivoted, as at 44, to the rack frame 21.

The driving shaft 3 has mounted thereon an eccentric 45 around which passes an eccentric strap 46 which is connected to an arm 47, to which is pivoted one end of the bell-crank levers 48, the other ends thereof being pivoted to the rack frame 34, see Fig. 1. The pins or stud shafts 15 and 29 are connected by the arms 49 and 50, respectively, to a shoe 51 which is slidably mounted in a guide 52 carried by the housing 2. The shoe 51 is adapted to receive a screw 53 which is rotatably carried by the housing or the guide 52 and is prevented from longitudinal movement therein in any desired manner. Secured to the worm 53 is an actuating crank 54.

In the embodiment seen in Fig. 11, I have shown means for reversing the direction of movement of the racks and thereby the direction of rotation of the driven shaft.

Each oscillating member is connected by a link 55 which is connected to one end of an elbow lever 56, which is connected by a link 57 to a plate 58 pivoted at 59 and provided with a slot 60.

61 designates a pin slidable in the slot 60 and having connected to it an arm 62 pivoted to a link 63, the other end of which is secured to a fixed pivot 64. Also pivoted to the arm 62 and the link 63 is an arm 65 pivoted to an elbow lever 66 which is secured to its rack 67. 68 designates an arm, one end of which is connected to the pin 61 and the other end of which is connected to a spring actuated lever 69.

In the embodiment seen in Fig. 12, the construction and arrangement of parts is similar to that seen in Fig. 1, except as to the location of the parts and the means for regulating the position of the shoes in the oscillating members. Instead of having the pins or stud shafts carried by the oscillating members, such as 8 and 26, and connected to a worm controlled shoe, I provide the arms 70 and 71 which are connected to such stud shafts and to a lever 72 which is fulcrumed at its lower end and bent, as at 73.

74 designates a handle lever which is bent, as at 75, and such bent portions 73 and 75 are connected by the links 76. Interposed between the levers 74 and 72 is a spring 77. The handle lever 74 is provided with the teeth 78, which intermesh with the rack segment 79. The construction seen in Fig. 12, as to the operating mechanism, is of the same construction as that seen in Fig. 2 except that it is turned upside down, and a detailed description of the construction and operation would involve needless repetition and is therefore omitted.

The operation of my novel speed changing mechanism will now be apparent to those skilled in the art and is as follows:

After the position of the shoes in the oscillating members 8 and 26 have been adjusted, a definite relative speed is maintained between the driving and driven shafts. This adjustment, in the embodiment seen in Figs. 1 to 10 inclusive, is effected by actuating the crank 54 to rotate the worm 53 and thereby longitudinally adjust the shoe 54, which is operatively connected to the shoes carried by the oscillating members 8 and 26. In the form seen in Fig. 11, the direction of rotation of the driven shaft is reversed by actuating the handle lever 69. In Fig. 12, this adjustment is effected by moving the handle lever 74 downwardly, then giving to it the desired movement so that upon the release of the handle lever 74, the teeth 78 will engage with the desired teeth of the rack 79. As the driving shaft 3 revolves, the oscillating members 8 and 26 are moved up and down, and since they are operatively connected,

with their respective racks, such racks are reciprocated, one rack moving forwardly, while the other rack is moving rearwardly. The rack frames which carry the racks are alternately raised and lowered, it being seen that as the eccentric 39 on the driving shaft 3 revolves, the arm 41 will be reciprocated, thereby causing the rack frame 21 to alternately rise and fall, thereby raising and lowering its rack 20. The same action takes place with respect to the rack frame 34 and its rack 33.

During the forward movement of a rack, its lower teeth are in mesh with the gear 37 and during its rearward movement, the upper teeth of a rack are in mesh with the gear 37.

By the employment of the construction seen in Fig. 11, it will be apparent that the oscillating arms are directly connected to the rack frames so that instead of the rack frames being controlled by an eccentric drive from the driving shaft, they are controlled by the oscillating arms.

It will also be apparent that in this construction as seen in Fig. 11, by actuating the operating lever, the direction of movement of the rack frames will be reversed, the result of which will be that the driven shaft will rotate in a reverse direction.

It will now be apparent that I have devised a novel and useful speed changing mechanism, which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described typical embodiments thereof which will give in practice satisfactory and reliable results, it is to be understood that these embodiments are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, a plurality of racks each having sets of teeth to alternately engage said gear, connecting mechanism coöperating with said driving shaft and racks to rotate said gear, and means operative independent of said connecting mechanism actuated by said driving member to cause different set of rack teeth of a rack to mesh with said gear during the movement of the rack in opposite directions.

2. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, a plurality of racks, each having sets of teeth to alternately engage said gear, connecting mechanism coöperating with said driving member and racks to ro-

tate said gear, and means operative independent of said connecting mechanism to raise and lower said racks during their reciprocations.

3. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, a plurality of racks each having sets of teeth to alternately engage said gear, oscillatory arms actuated by said driving member and operatively connected with said racks to reciprocate them, and means independent of said arms to cause said racks to rotate said gear in one direction only.

4. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, a plurality of racks each having sets of teeth to alternately engage said gears, oscillatory arms actuated by said driving member and operatively connected with said racks to reciprocate them, and means independent of said arms and actuated by said driving member to cause different sets of teeth of the racks to mesh with said gear when the racks are moving in reverse directions.

5. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, a plurality of racks constructed to mesh with said gear to rotate it in one direction only, oscillatory arms actuated by said driving member and provided with cam slots, and shoes in said slots and operatively connected with said racks to reciprocate them.

6. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, a plurality of racks constructed to mesh with said gear to rotate it in one direction only, oscillatory arms actuated by said driving member and provided with cam slots, shoes in said slot and operatively connected with said racks to reciprocate them, and means to adjust the position of said shoes to vary the relative speed of said driving and driven shaft.

7. In a speed changing mechanism, a driving member, a driven member, oscillatory arms actuated by said driving member, shoes adjustable on said arms and operatively connected with said driven member to drive it, and means to adjust the position of said shoes to vary the relative speed of said driving and driven members.

8. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said driven shaft, racks having sets of rack teeth to alternately engage said gear, oscillatory arms actuated by said driving shaft and provided with slots, shoes in said slots, levers actuated by said shoes and connected with said racks to reciprocate them, rack frames in which said racks are mounted, and means to raise and lower said rack frames.

9. In a speed changing mechanism, a 130

driving shaft, a driven shaft, a gear on said driven shaft, racks having sets of teeth to alternately engage said gear, oscillatory arms actuated by said driven shaft and
 5 having slots, shoes in said slots, levers actuated by said shoes and connected with said racks to reciprocate them, rack frames in which said racks are slidable, means actuated by said driving shaft to move said
 10 rack frames relatively to said gear, and means to adjust the position of said shoes in their respective slots.

10. In a speed changing mechanism, a driving shaft, a driven shaft, a gear on said
 15 driven shaft, racks to mesh with said gear to rotate it in one direction, oscillatory arms actuated by said driving shaft and operatively connected with said racks to reciprocate them, and means coöperating
 20 with said arms to reverse the direction of rotation of said gear.

11. In a speed changing mechanism, a driving member, a driven member, a gear
 25 on said driven member, racks to mesh with said gear, oscillatory arms having slots and actuated by said driving member, shoes in said slots operatively connected with said racks to reciprocate them, means to effect
 30 relative movement of said racks and gear to cause different teeth to mesh with said gear when the racks travel in reverse directions, links connected with said shoes, and an adjusting member operatively connected with said links to vary the position of said

shoes in their respective slots and thereby 35 the relative speed of the said driving and driven members.

12. In a speed changing mechanism, a driving member, a driven member, a gear
 40 on said driven member, racks each having an upper and a lower set of teeth to alternately mesh with said gear, oscillatory arms actuated by said driving member and having slots, shoes in said slots and operatively
 45 connected with said racks to reciprocate them, means to adjust the position of said shoes, and means to effect relative movement of the racks and gear to cause the upper teeth of a rack to mesh with it when the rack is moving rearwardly and the lower
 50 teeth of the same rack to mesh with it when such rack is moving forwardly.

13. In a speed changing mechanism, a driving member, a driven member, a gear
 55 on said driven member, a plurality of racks each having sets of teeth to alternately engage said gear, rack frames in which said racks are slidable, connecting mechanism coöperating with said driving member and racks to rotate said gear, and means coö-
 60 perating with said connecting mechanism to reverse the direction of rotation of said driven member.

WALTER B. JACKSON.

Witnesses:

H. S. FAIRBANKS,
 C. D. McVAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX

1,238,056 ----- L. P. Valiquet,
Patented - Aug. 21, 1917,
Filed - March 7, 1914, Renewed
June 18, 1917.

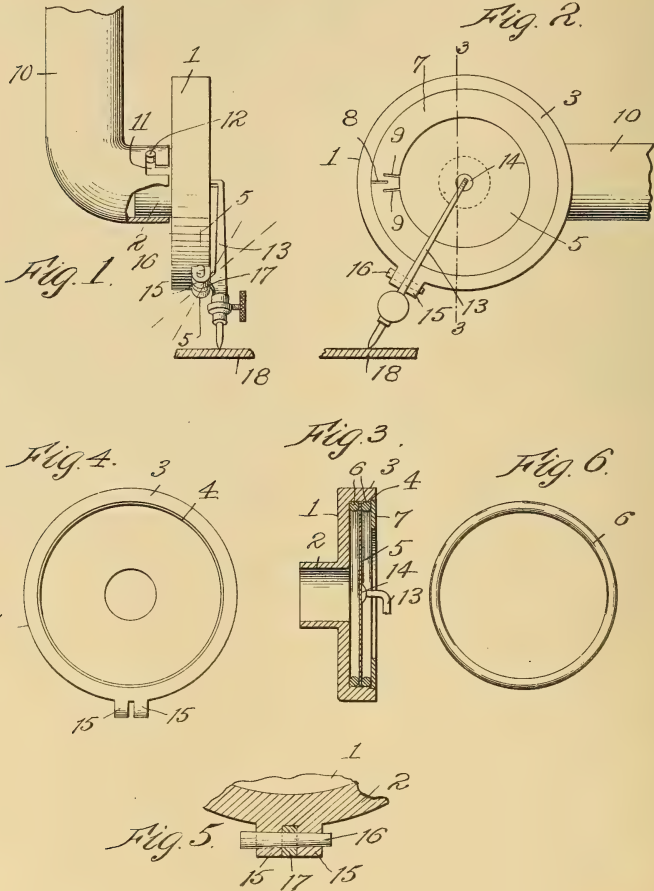
L. P. VALIQUET.

SOUND BOX.

APPLICATION FILED MAR. 7, 1914. RENEWED JUNE 18, 1917.

1,238,056.

Patented Aug. 21, 1917.



Witnesses:
M. G. Crawford
A. E. Humphrey

Inventor
Louis P. Valiquet
By his Attorney *Marshall*

UNITED STATES PATENT OFFICE.

LOUIS P. VALIQUET, OF BOSTON, MASSACHUSETTS.

SOUND-BOX.

1,238,056.

Specification of Letters Patent.

Patented Aug. 21, 1917.

Application filed March 7, 1914, Serial No. 823,260. Renewed June 18, 1917. Serial No. 175,502.

To all whom it may concern:

Be it known that I, LOUIS P. VALIQUET, a citizen of the United States of America, residing at Boston, county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

My invention comprises generally certain improvements designed to simplify and cheapen the construction of sound boxes, and is more particularly adapted to those for use on talking machines using flat disk record tablets. The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a front elevation of a sound box in operative position for use with a sound record having a laterally undulating groove, with the supporting tone-arm broken away and turned upward to show it more clearly,

Fig. 2 is a side elevation of the same with the tone arm turned down in proper position,

Fig. 3 is a cross section of the sound box taken on line 3—3 of Fig. 2.

Fig. 4 is a detailed front view of the cup shaped body of the sound box,

Fig. 5 is a detailed section on line 5—5 of Fig. 1, and

Fig. 6 is a detail of one of the gaskets.

Throughout the drawings like reference characters indicate like parts.

1, is the cup shaped body of a common form of sound box having annular flange 3, and a central tubular extension 2, provided with an outwardly projecting pin 12, adapted to engage slot 11, in tone-arm 10, and form a bayonet joint therewith. The flange 3, has an annular internal shoulder 4, thereon forming a recess deep enough to hold the retaining ring 7, flush with the outer surface of the flange. This ring 7, is preferably stamped out of a flat sheet of metal and has slots 8, and 9, 9, located closely together and extending part way across it. Some of these slots, as 8, extend from the outer edge of the ring inwardly, and others, as 9, 9, extend from the inner edge of the ring outwardly. The inwardly extending slots overlap the outwardly extending ones, each set preferably extending a short distance beyond the medial line of the ring.

5, is the usual diaphragm held between

gaskets 6, 6, and attached to stylus arm 13, by a button of cement 14, in a well known manner. 18, indicates the usual form of sound record tablet having a laterally undulating sound record groove therein. 15, 15, are two lugs on the outer surface of flange 3, of the cup shaped sound box body 1, which are spaced apart just far enough to hold the lug 17, formed on stylus arm 13, snugly between them. Lugs 15, and 17, are bored and reamed to fit a tapered pivot pin 16, shown in exaggerated detail in Fig. 5.

In assembling the parts of the sound box, the diaphragm and gaskets are placed in the cup shaped recess in member 1, which may be stamped and drawn out of one piece of metal and the retaining ring 7, is sprung into place. This ring is usually stamped out of a sheet of metal, and has an external diameter slightly in excess of the internal diameter of flange 3, but the overlapping slots 8, and 9, give the ring a slight radial compressibility, so that it can be forced inside of flange 3, up against shoulder 4. When so placed its tendency to expand radially will cause it to grip flange 3, and hold it firmly in position, retaining the diaphragm 5, compressed between gaskets 6, 6. Whenever it is desired to remove the diaphragm or gaskets the retaining ring 7, can be easily unseated by inserting a knife blade or other thin flat tool through slot 8, under the ring and prying outwardly. The foregoing parts being assembled in position the stylus arm lug 17, is inserted between lugs 15, 15, all three having had holes of the same size bored in them, and all three thus assembled are reamed out to the proper taper at one operation. The pivot pin 16, tapered at the same angle, is then forced into place, and the stylus arm 13, is oscillated back and forth, as indicated in dotted lines in Fig. 1, until the working faces of pin 16, and perforation in lug 17, wear down to a degree which will give just the proper freedom of motion to the stylus to permit it to vibrate under the action of the sound record groove without chattering on its pivot. This, as indicated, does not result in loosening the frictional hold of the pin in the parts 15 because that is intentionally greater than the hold of the stylus arm on said pin, as will be apparent from the drawings, especially Fig. 5. This can be readily determined by the workman through his sense of touch after a little practice. The

inner end of the stylus arm is then fastened to the diaphragm 5, by cement button 14, and the sound box is complete.

The advantages of my invention comprise its simplicity, cheapness and ease of manipulation. There are no screws or other parts to work loose and rattle, and all the elements of the combination are held firmly together by friction of the closely fitted parts to form a resonant structure giving an excellent tone reproduction.

The slots 8, and 9, in the retaining ring 7, may be varied in number and location, within limits, according to the desired degree of elasticity to be given to said ring, and details of the construction might be modified without departing from the principle of my invention. Sound boxes designed to coöperate with record tablets having vertically undulating grooves may also be constructed according to my invention.

Having described my invention, I claim:

1. A sound box having a retaining ring formed of an annular flat metal sheet having two or more slots cut part way across it and located closely together, some extending inwardly from the outer circumference of the ring and others outwardly from the inner circumference, so as to overlap one another.

2. A flat, sheet metal diaphragm-retaining ring for a sound box having slots cut therein to give it a slight elasticity in radial directions, some of said slots extending from the outer circumference of the ring toward the center and others extending from the inner circumference outwardly, the slots of one set overlapping those of the other.

3. In combination with a sound-box, a supporting part on the sound-box having two spaced side-portions, a stylus arm having a portion located between said side-portions,

the side-portions and the stylus arm having a taper hole therein, and a taper pin upon which the stylus arm is adapted to vibrate, said pin being forced into the hole in the side-portions and the stylus arm, and having a greater frictional hold in the side-portions than in the stylus arm.

4. In combination with a sound-box, a supporting part on the sound-box; a stylus arm; said supporting part and said stylus arm having registering openings formed transversely therethrough; and a taper pin, upon which the stylus arm is adapted to vibrate, forced small end first successively through the holes in said stylus arm and supporting part, so as to frictionally hold the former snugly against the latter to prevent it from rattling; said pin having a greater frictional hold in said supporting part than in said stylus arm.

5. In combination with a sound-box, a supporting part on the sound-box; a stylus arm having a transverse hole therethrough; said supporting part being provided with a tapered transverse hole which registers with the first-named hole and has an appreciably greater length than that hole; and a taper pin, upon which the stylus arm is adapted to vibrate, forced through said holes so as to frictionally hold the stylus arm snugly against the supporting part to prevent it from rattling; said pin having a greater frictional hold in said supporting part than in said stylus arm.

6. A sound-box provided with a flat, sheet metal diaphragm-retaining ring which is slit radially part way across so as to give it a slight radial compressibility.

LOUIS P. VALIQUET.

Witnesses:

A. PARKER-SMITH,
M. G. CRAWFORD.

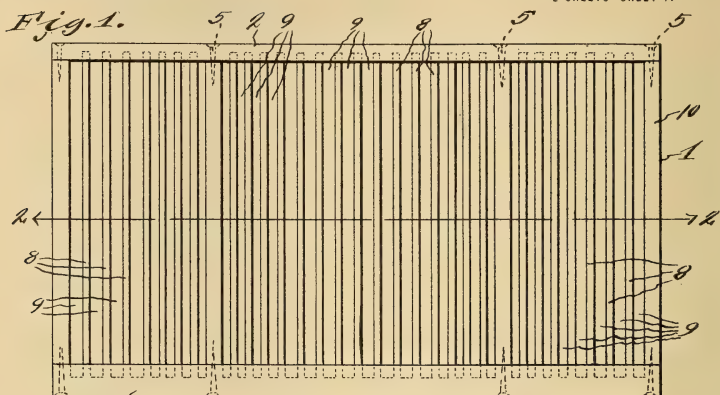
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE RECORD CABINET

1,238,112 ----- P. A. Deterling,
Patented - Aug. 28, 1917,
Filed - June 30, 1916.

1,238,112.

2 SHEETS—SHEET 1.



Witnesses
Philip Tenill
Frances G. Bowell

১৫৮

D. Swift & Co

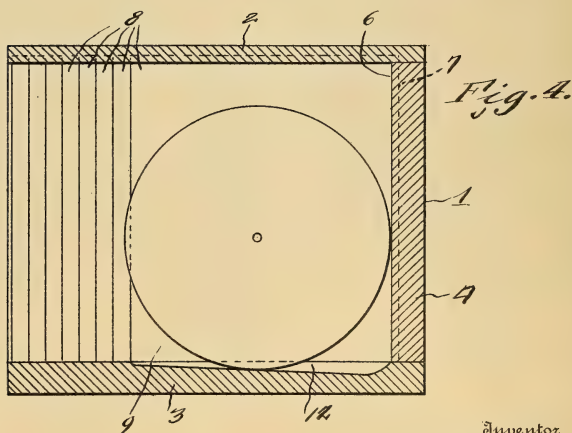
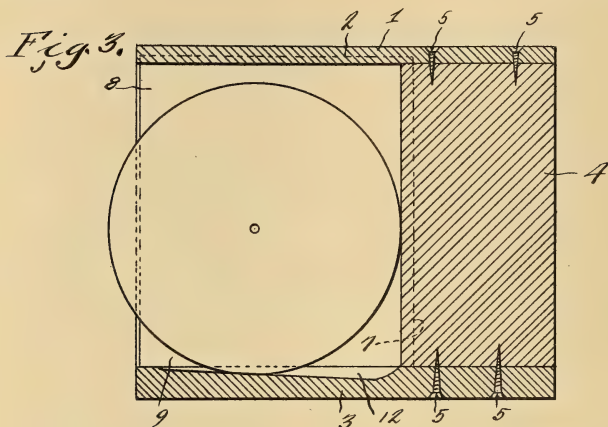
His Attorneys

P. A. DETERLING.
TALKING MACHINE RECORD CABINET.
APPLICATION FILED JUNE 30, 1916.

1,238,112.

Patented Aug. 28, 1917.

2 SHEETS—SHEET 2.



Witnesses
Philip Mull
H. Myers J. D. Howell

Inventor
P. A. Deterling

By

R. Swift & Co.
Attorneys

UNITED STATES PATENT OFFICE.

PHILIP A. DETERLING, OF MUNCIE, INDIANA.

TALKING-MACHINE-RECORD CABINET.

1,238,112.

Specification of Letters Patent.

Patented Aug. 28, 1917.

Application filed June 30, 1916. Serial No. 106,834.

To all whom it may concern:

Be it known that I, PHILIP A. DETERLING, a citizen of the United States, residing at Muncie, in the county of Delaware, State of Indiana, have invented a new and useful Talking-Machine-Record Cabinet; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the art of talking machine record cabinets, and more particularly to an improved cabinet for disk records, and an object of the invention is to provide a cabinet of this kind having compartments varying in thickness, whereby records of different thicknesses may be received and supported.

Another object of the invention is to construct said compartments in staggered relation, thereby enabling the disk records to be easily extracted or withdrawn.

A further object of the invention is to eliminate the usual disk record handling device, by arranging said compartments in such aforesaid relation, so that each and every record may be easily grasped and withdrawn.

In practical fields, the details of construction may necessitate alterations falling within the scope of what is claimed.

The invention comprises further features and combination of parts, as hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a view in front elevation of the improved cabinet constructed in accordance with the invention.

Fig. 2 is a sectional view on line 2—2 of Fig. 1.

Fig. 3 is a sectional view on line 3—3 of Fig. 2.

Fig. 4 is a sectional view on line 4—4 of Fig. 2.

Referring more especially to the drawings, 1 designates a cabinet as a whole, which may be of any suitable design, contour or configuration, or may be constructed as a separate cabinet, or as a part of a talking

machine cabinet. However, this cabinet comprises a top piece 2 and a bottom piece 3 and a rear piece 4, to which the top and bottom pieces or sections are secured in any suitable manner, preferably by screws 5. The back section or piece 4 is provided with a pair of V-shaped depressions 6. It is to be understood that there may be only one, or more than two of such depressions. The walls (which are inclined rearwardly) are provided with pluralities of recesses 7, which are at spaced relation to each other. Secured in any suitable manner in said recesses 7 and extending forwardly are partitions 8, which are of equal width, but owing to the V-shaped contour of the depressions 6, the forward edges or portions of said partitions, assume positions each beyond the other beginning with the partition at the bottom of each depression 6. The compartments 9 are correspondingly arranged. In other words, the partitions 8 and the compartments 9 are in stepped relation, therefore, the talking machine disk records will be correspondingly held in stepped relation. It is to be observed that some of the compartments 9 are thicker than others, the thicker compartments receiving thick records, whereas the narrower compartments are adapted to receive thin records. The end pieces or sections 10 of the cabinet are secured to the end edges of the back section or piece by means of the screws 11. It is to be noted that the upper face of the bottom piece or section forwardly of the back piece or section is provided with a plurality of grooves 12, forming the bottoms of said compartments, which bottoms are inclined rearwardly, thereby preventing the records from rolling forwardly.

The invention having been set forth, what is claimed as new and useful is:

In a talking disk record cabinet, the combination of a back section and top and bottom sections secured thereto, of end sections joined to the back section and top and bottom sections, and a plurality of partitions, the back section having V-shaped depressions and irregularly spaced rabbets formed in these depressions, the top section and bottom section both having irregularly spaced

rabbets registering with the rabbets in the back section, the partition members being secured in the rabbets formed in the three sections and providing compartments of various widths to receive disk records of various thicknesses.

In testimony whereof I have signed my

named to this specification in the presence of two subscribing witnesses.

PHILIP A. DETERLING.

Witnesses:

OLIN BELL,
ALBERT L. HUBER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH

1,238,168 ----- H. B. McNulty,
Patented - Aug. 28, 1917,
Filed - Sept. 14, 1916.

H. B. McNULTY.
 PHONOGRAPH.
 APPLICATION FILED SEPT. 14, 1916.

1,238,168.

Patented Aug. 28, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

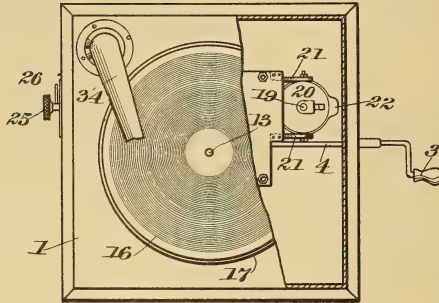


Fig. 2.

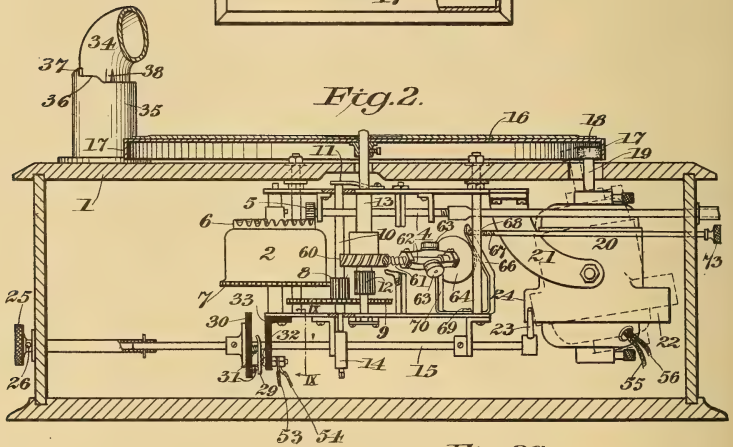


Fig. 3.

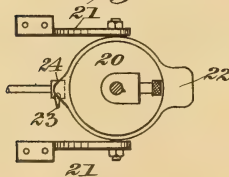
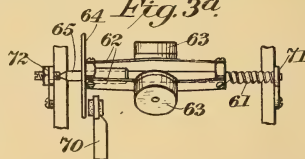


Fig. 3a.



Inventor

Harry B. McNulty,

By Frederick V. Winters

Attorney

1,238,168.

Patented Aug. 28, 1917.
 2 SHEETS—SHEET 2.

Fig. 4.

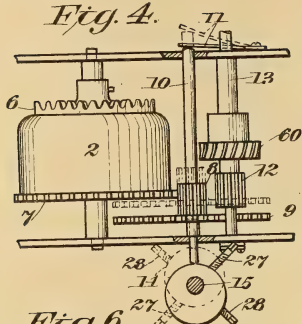


Fig. 5.

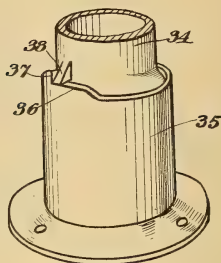


Fig. 6.

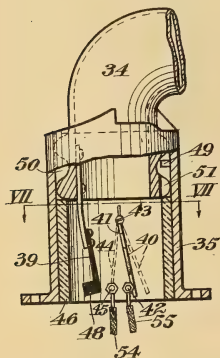


Fig. 7.

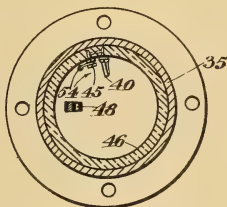


Fig. 8.

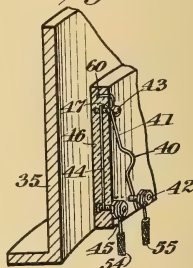


Fig. 9.

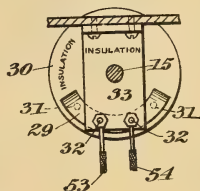
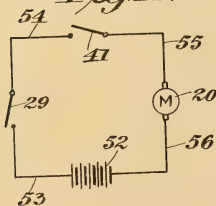


Fig. 10.



Inventor

Harry B. McNulty

By Frederick V. Winters

Attorney

UNITED STATES PATENT OFFICE.

HARRY B. McNULTY, OF NEW YORK, N. Y.

PHONOGRAPH.

1,238,168.

Specification of Letters Patent.

Patented Aug. 28, 1917.

Application filed September 14, 1916. Serial No. 120,048.

To all whom it may concern:

Be it known that I, HARRY B. McNULTY, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a full, clear, and exact specification.

This invention relates to phonographs or talking machines, especially to the means for rotating the record carrier, and has for its object to provide a phonograph with two different means of power which may be interchangeably utilized for rotating the record carrier. The special aim of the invention is to provide a phonograph with a spring motor and an electric motor both built into the machine and either adapted to drive the record carrier but only one being capable of operating at a time. Thus, when the purchaser's home is equipped with electric lights, the phonograph may be driven by the electric motor, whereas the spring motor may be utilized at any time when the machine is to be used where electric current is not accessible. Subsidiary objects will appear as the description proceeds.

The invention will be first hereinafter described in connection with the accompanying drawings, wherein similar reference characters are used to designate corresponding parts throughout the several views, and then more specifically defined in the claims at the end of the description.

In the drawings:—

Figure 1 is a broken plan view of a phonograph equipped with two means of power and otherwise constructed substantially in accordance with this invention.

Fig. 2 is a broken vertical section through the machine on a larger scale and clearly showing the two motors and means for interchangeably throwing one of them in and the other one out of driving connection with the turn table.

Fig. 3 is a detail plan view of the electric motor and the means for swinging it to disengage its driving pulley from the flange on the turn table.

Fig. 3^a is a detailed view of the governor.

Fig. 4 is a detail vertical section at right angles to that of Fig. 2, showing the means for throwing the spring motor in and out of driving connection with the turn table post.

Fig. 5 is a detail perspective view of the stationary collar in which the tone arm is rotatably fitted.

Fig. 6 is a broken vertical section of the same showing the automatic switch carried by said collar and tone arm for breaking the circuit to the electric motor when the tone arm is turned to one side off of the turn table.

Fig. 7 is a horizontal section on the line VII—VII of Fig. 6.

Fig. 8 is a fragmentary perspective of a part of the stationary collar, showing the wiring to the switch carried thereby.

Fig. 9 is a detailed section on the line IX—IX of Fig. 2, showing the primary switch controlling the electric motor and which is opened or closed as the spring motor is thrown in or out of driving connection with the turn table post, and

Fig. 10 is a diagrammatic view of the circuit to the electric motor, showing the primary and secondary switches which are carried by the rock-shaft and tone arm respectively.

In the casing 1 of the phonograph there is operatively mounted a spring motor 2 of any well known make, said spring motor being adapted to be wound up by means of a crank 3 on the end of a shaft 4 carrying a pinion 5 at its other end meshing with the gear surface 6 on the spring motor. A gear 7 on the spring motor meshes with a small pinion 8 integral with a large gear 9 and mounted fast on a vertically movable post 10, Figs. 2 and 4. The post 10 is normally held down by a leaf spring 11 engaging its upper end in the position shown in Fig. 2 with the large gear 9 out of mesh with the small pinion 12 on the turn table post 13. The lower end of the post 10 rests upon a cam 14 on a rock-shaft 15, whereby said post may be raised to bring the gear 9 into mesh with the pinion 12 when it is desired to utilize the spring motor for driving the turn table 16.

The turn table has a depending peripheral flange 17 engaged by a soft rubber roller 18 on the armature shaft 19 of the electric motor 20 which is pivoted to swing between arms 21 depending from a part of the casing of the machine. The motor 20 has a weighted projection 22 on its outer face which serves to normally hold the roller 18 in engagement with the flange 17 on the turn table and cause said roller to adjust itself to take

care of any irregularities in said flange. When the parts of the machine are in the positions shown in Fig. 2 (solid lines), the turn table will be driven by the electric motor and the spring motor will be disengaged from the turn table post.

To disengage the roller 18 from the flange of the turn table when the spring motor is thrown into driving connection with the turn table post, the rock-shaft 15 is provided with a laterally extending pin 23 adapted to engage a rounded knob 24 on the inner face of the motor 20, Figs. 2 and 3, so that when the rock-shaft is turned to raise the post 10 on the cam 14 for connecting up the spring motor with the turn table post 13, the pin 23 will ride up the knob 24 and swing the electric motor sufficiently to separate the roller 18 from the flange of the turn table, as indicated in dotted lines in Fig. 2. The rock-shaft 15 is fitted with an operating handle 25 and may also have a pointer or indicator 26 for showing on the outside of the casing 1 whether the machine is set to run by the electric motor or the spring motor.

As illustrated in Fig. 4, the cam 14 has two radially projecting pins 27 and 28 of different sizes and disposed at right angles to each other. The longer pin 27 serves as a stop to limit the turning of the rock-shaft in one direction, while the shorter pin 28 limits the turning of the rock-shaft in the other direction.

In order to automatically cut off the current to the electric motor when the rock-shaft is turned to throw said motor out of driving connection and the spring motor into driving connection with the turn table, a switch 29 (hereinafter referred to as the primary switch) is mounted on a disk 30 of insulating material carried by the rock-shaft, Figs. 2 and 9. This switch 29 is in the form of an arcuate plate and is pressed by springs 31 into contact with a pair of spaced contacts 32 carried by a fixed bracket 33 also of insulating material. When the rock-shaft is turned to the right to throw out the spring motor and throw in the electric motor, as shown in Fig. 2, the switch plate 29 will be brought into engagement with both of the contacts 32 as shown in Fig. 9, thus closing the circuit through said contacts. When the rock-shaft is turned to the left to throw out the electric motor and throw in the spring motor, the switch plate 29 passes off of one of the contacts 32 and thereby breaks the circuit to the electric motor.

When the machine is being operated by the electric motor it is advantageous to have a secondary switch for automatically breaking the circuit when the tone arm is swung to one side for the purpose of changing needles. As illustrated in Figs. 5 and 6, the

tone arm 34 is swiveled in a stationary collar 35 suitably secured to the casing 1 of the machine, and the secondary switch is carried by said collar and operated by a finger carried by the tone arm. The upper edge of the collar 35 has a raised portion 36 terminating in an abrupt shoulder 37. The tone arm has a projecting lug 38 resting upon said upper edge of the collar, and as said tone arm is swung around to one side of the turn table the lug 38 rides up onto the raised portion 36, thereby elevating the arm sufficiently to permit the needles to be changed, as will be readily understood. As the lug 38 is brought into engagement with the stop shoulder 37, a depending finger 39 carried by the tone arm, Figs. 6 and 7, will engage the projecting loop 40 of the resilient switch member 41 and move it away from the binding post 42, thus breaking the circuit which as illustrated in Fig. 8 normally runs through said binding post 42, switch member 41, fastening screw 43 therefor, wire 44 and second binding post 45. The wire 44 is embedded in and the switch member 41 is mounted on a lining 46 of insulating material on the inside of the collar 35. The screw 43 engages an eye 47 formed in the switch member 41, and the extremity 60 of said member is bent inward and embedded in the insulating lining 46 for holding the member normally in contact with the binding post 45. The end of the finger 39 is preferably made of insulating material as shown in Fig. 6, and is only arranged in the path of the loop 40 when the lug 38 rides up onto the raised portion 36 of the upper edge of the collar 35. At all other times the head 48 of the finger 39 is below the level of said loop 40, as shown in Fig. 6.

The tone arm 34 may be detachably connected to the collar 35 by means of an inwardly extending pin 49 on the collar normally fitting in an annular groove 50 in the exterior of the tone arm. An axial groove 51 runs from the lower end of the tone arm into the annular groove 50 to permit the pin 49 to pass into and out of the latter groove when the tone arm is inserted into and withdrawn from the collar.

The diagrammatic view of the electric circuit shown in Fig. 10 indicates the source of current supply as a generating battery 52 from one side of which a conductor 53 leads to the primary switch 29. A conductor 54 leads from the primary switch to the secondary switch 41, and from thence a conductor 55 leads to the electric motor 20, said motor being connected to the other side of the battery by another conductor 56.

Any suitable governor may be used for controlling the speed of the record carrier or turn table. The form of governor shown in Figs. 2 and 3, consists of axially extending spring arms 62 carrying weights 63 and con-

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nected at one end to a worm 61 meshing with a worm gear 60 on the turn table post 13, and at the other end attached to a disk 64 slidable axially along the shaft 65 journaled in an upright 72. The worm 61 is journaled in another upright 71, and when the governor is rotated rapidly through the worm gear on the turn table post meshing with the worm 61, the weights 63 cause the spring arms 62 to bow outwardly due to centrifugal force and slide the disk 64 into contact with the arm 70 of an adjustable lever pivoted at 69 and having another arm 66 engaged by the threaded end 68 of an adjusting screw 67 having a knob 73 projecting from the casing. When the knob 73 is turned to press the arm 66 of the lever inward, the arm 70 will be advanced toward the disk 64 and cut down the speed of the turn table, and vice versa.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

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1. In a phonograph, the combination with a record carrier, of a spring motor, movable gears for coupling up the spring motor to drive the record carrier, and a rock-shaft for moving said gears.

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2. In a phonograph, the combination with a record carrier, of a spring motor, movable gears for coupling up the spring motor to drive the record carrier, a pivotally support-

ed electric motor normally in driving connection with the record carrier, and a rock-shaft for moving said gears and swinging 35 the electric motor out of driving connection.

3. In a phonograph, the combination with a record carrier, of a spring motor, movable gears for coupling up the spring motor to drive the carrier, means for normally hold- 40 ing said gears out of driving connection, a pivotally supported electric motor normally in driving connection with the record carrier, a rock-shaft, a cam on said shaft for moving the gears into driving connection, 45 and means also carried by said shaft for swinging the electric motor out of driving connection at the same time.

4. In a phonograph, the combination with a record carrier, of a spring motor, movable gears for coupling up the spring motor to drive the carrier, a pivotally supported electric motor normally in driving connection 50 with the record carrier, a rock-shaft for simultaneously moving said gears into driving connection and swinging the electric motor out of driving connection, and a circuit breaker controlling the electric motor and mounted on said rock-shaft for breaking 60 the circuit when said electric motor is swung out of driving connection.

In testimony whereof I have signed my name to this specification.

HARRY B. McNULTY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

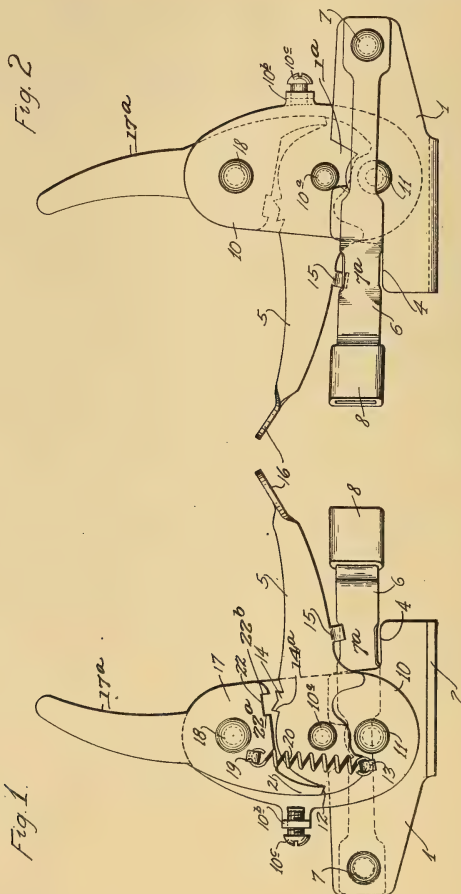
PHONOGRAPH BRAKE

1,238,240 ----- J. Wittek,
Patented - Aug. 28, 1917,
Filed - Nov. 18, 1915.

J. WITTEK.
 PHONOGRAPH BRAKE.
 APPLICATION FILED NOV. 18, 1915.

1,238,240.

Patented Aug. 28, 1917.
 3 SHEETS—SHEET 1.



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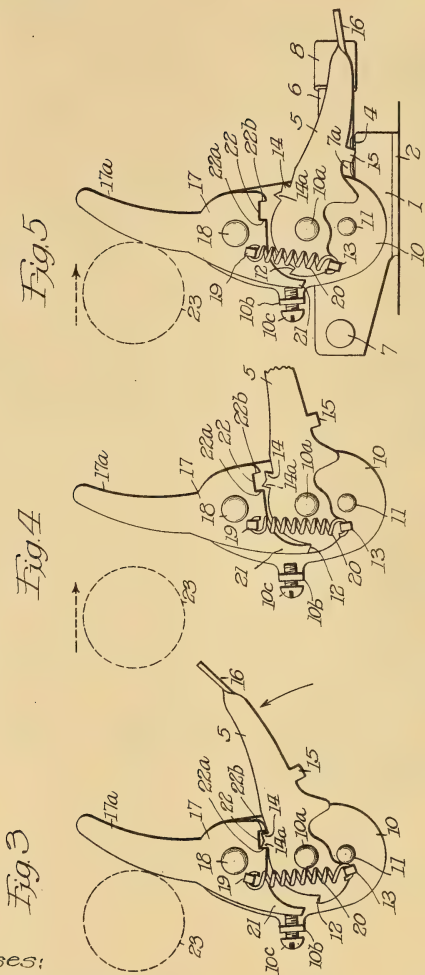
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1,238,240.

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3 SHEETS—SHEET 2.



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1,238,240.

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3 SHEETS—SHEET 3.

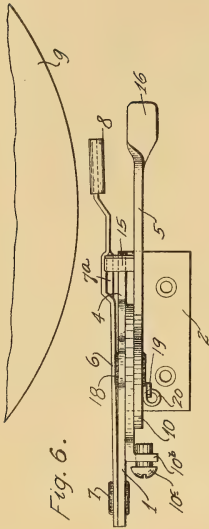


Fig. 6.

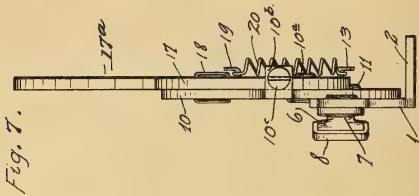


Fig. 7.

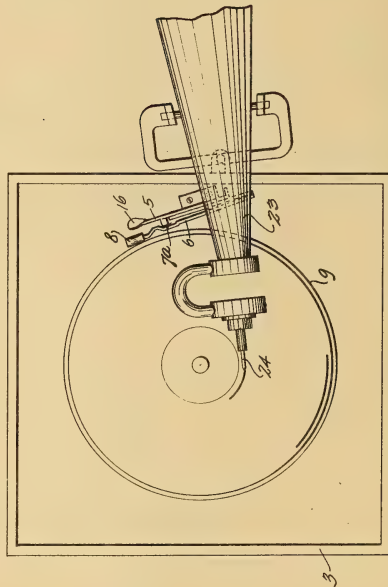


Fig. 8.

WITNESSES

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UNITED STATES PATENT OFFICE.

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PHONOGRAPH-BRAKE.

1,238,240.

Specification of Letters Patent. Patented Aug. 28, 1917.

Application filed November 13, 1915. Serial No. 62,222.

To all whom it may concern:

Be it known that I, JOSEF WITTEK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Phonograph-Braques, of which the following is a specification.

My invention relates to automatic braking mechanism for use in conjunction with phonographic and similar machines.

One of the primary objects of my invention is the provision of a device of this character which will be accurate and sensitive, which can be easily and quickly set to any desired stop position and which can be economically manufactured and readily applied to a phonograph.

Among the salient features embodied in my improved device is a structure comprising an actuating arm pivotally mounted on a movable support and coöperating with a latch or trigger, all of which are manually adjusted and set in position in one operation by means of said actuating arm. The latch or trigger is disposed in the path of and is tripped by a moving element of the machine at a predetermined point in its travel, thus causing a brake member to be forced into frictional engagement with the turntable so as to stop the machine.

My invention will be understood by reference to the accompanying drawings, in which—

Figure 1 is an elevational view of a device embodying my invention, the parts being shown in set position ready to be tripped by the tone arm of a phonograph;

Fig. 2 is a similar view looking at the opposite side from that shown in Fig. 1;

Fig. 3 shows the trigger being pressed into engagement with the tone arm of the phonograph when the device is being set;

Fig. 4 shows the position of the trigger with respect to the actuating arm just before the device is tripped by the tone arm;

Fig. 5 shows the device just after it has been tripped by the tone arm, the actuating arm being in its down position against the brake arm to apply the brake;

Fig. 6 is a plan view of the brake mechanism;

Fig. 7 is an end view thereof; and

Fig. 8 is a plan view showing the braking mechanism applied to a phonographic machine.

Similar reference characters refer to corresponding parts throughout the several views. A bracket 1, upon which the operating parts of my invention are carried, comprises an upright portion provided with a lateral flange or a base portion 2 which is adapted to be secured by screws or the like to the casing 3 of the phonographic machine. An oval plate 10 is pivoted near its lower end to the bracket by a rivet 11 which frictionally holds said plate in any position to which it has been adjusted about its pivot, and at 10^a there is pivoted on the plate an actuating arm 5. One head of the pivot 10^a is adapted to engage with the sides of the recess 1^a formed in the bracket 1, which limits the angular positions which said plate may assume, the purpose of which will be described later. Upon the plate 10 there is also pivoted at 18 a trigger or latch 17 having an upwardly extending finger 17^a adapted to be engaged by the tone arm 23. A contractile spring 20 is fastened to the lug 13 of the actuating arm 5 and the lug 19 of the latch 17. This spring is disposed to one side of the pivots 10^a and 18 so as to normally retain the finger 21 against the heel or shoulder 12 on the actuating arm.

The actuating arm is provided with a lateral extension 15 adapted to engage an inclined surface 7^a formed on the outer face of a braking arm 6 made of resilient sheet metal which is fixedly riveted to the bracket 1 at 7. This braking arm has at its free end a brake shoe of rubber or other similar material which is adapted to be forced against the turntable 9, as shown in Fig. 8. The actuating arm 5 and the latch 17 form what might be termed a compound trigger, and when it is desired to set the parts in position to be tripped by the tone arm 23 the actuating arm is rotated in a counter-clockwise direction by grasping the finger-piece 16 whereupon the tooth 14^a will engage with the shoulder 22^a of the recess 22, and cause a limited clockwise rotation of the latch 17 about its pivot 18 until the prong or finger 21 abuts against the screw 10^c mounted in the lug 10^b formed on the plate 10, as shown in Fig. 3, whereupon the plate 10 and all

the parts mounted thereon will rotate as a unit about the pivot 11 in a counter-clockwise direction.

It will be understood, of course, that the tone arm 23 has been previously swung inwardly so that the stylus 24 rests in the innermost groove of the record disk. The plate 10 and the parts carried thereby are swung in a counter-clockwise direction about the pivot 11 as has been previously described, until the finger 17^a of the latch abuts against the tone arm 23 as shown in Fig. 3. The tone arm is then swung outwardly to starting position near the periphery of the disk and upon release of the finger-piece 16 the actuating arm 5 will be swung on its pivot in a clockwise direction by the spring 20. As this arm begins to swing downwardly the outer edge of the tooth 14 on its upper edge will engage the opposed face 22^b of the notch 22 in the latch 17, thereby causing the latch to swing on its pivot 18 in a counter-clockwise direction from the position shown in Fig. 3 to that shown in Fig. 4 to dispose the latch finger 21 in the path of the shoulder 12 whereby further movement of the arm 5 is prevented and the parts are locked in set position.

It will be noted that when the parts move from the position shown in Fig. 3 to that shown in Fig. 4 the plate 10 remains stationary while the latch 17 and arm 5 swing on their respective pivots in opposite directions. The trigger finger 17^a moves therefore a limited distance toward the tone arm as soon as the tone arm has been swung outwardly to starting position. The extent of this movement is determined by the adjustment of the screw 10^c. By adjusting this screw the sensitiveness of the device may be regulated. If, for instance, the screw is threaded inwardly so that the swinging movement of the latch from the position shown in Fig. 3 to Fig. 4 is slight when the tone arm is withdrawn, the tone arm will not engage the latch finger until the stylus has nearly reached the last record groove and the device will not be tripped until after the tone arm has passed the position that it assumed when the parts were set. If, on the other hand, the screw 10^c does not project inwardly so far the swinging movement of the finger 17^a toward the tone arm will be greater so that the tone arm will engage the finger sooner during its playing movement and the device will therefore be tripped quicker. Adjustment of the screw inwardly therefore retards the tripping action of the device and adjustment of the screw outwardly advances the tripping action. It will be manifest therefore that by adjusting the screw the device may be regulated to trip at exactly the proper time.

The shoulder 22^b cooperating with the tooth 14 insures locking engagement be-

tween the end of the latch finger 21 and the shoulder 12, as has been previously explained, so that the device when set assumes the position shown in Fig. 4. When the tone arm 23 has traveled from the periphery of the disk to the last playing groove near the center it engages the latch finger 17^a, swings the latch in a clockwise direction about its pivot 18, thereby withdrawing the finger 21 from the shoulder 12 so that the actuating arm 5 will be swung by the spring 20 into the position shown in Fig. 5. During the downward movement of the operating end of the arm 5 the lateral extension 15 engages the inclined face 7^a of the brake arm 6 and forces the brake shoe 8 into engagement with the turntable 9 to stop the machine. When the device is reset the brake arm 6 returns to normal position in the path of the extension 15 by reason of the resiliency of its metal and the rigid attachment to the bracket 1 through the rivet 7.

It is believed that my invention and its mode of operation will be understood from the foregoing without further description and it should be obvious that the size, shape, proportion and arrangement of the various parts shown in the embodiment illustrated herein are capable of considerable modification without departing from the scope of my invention as defined by the following claims:

What is claimed is:—

1. In a phonograph brake, a supporting bracket, a brake rod secured to said bracket, a brake shoe carried on said brake rod, a plate pivotally carried by said supporting bracket, a compound trigger carried by said plate, said trigger comprising separate pivotal levers adapted for releasable locking engagement with each other whereby they may be moved from normal to set position, a projection formed on one of said pivotal levers for engagement with said brake rod when said trigger is sprung, and a spring connecting the component parts of said trigger for yieldingly retaining its parts in set relation.

2. In a phonograph brake, a supporting bracket, a brake rod secured to said bracket, a brake shoe carried by said brake, a plate pivotally carried by said supporting bracket, a compound trigger carried by said plate, said trigger comprising separate pivotal levers, the pivots of said levers being in alignment with the pivot of said oval plate, a heel formed on one of said levers, a prong formed upon the other lever for engagement with said heel whereby said levers may be moved from normal to set position, a projection formed on one of said levers for engagement with said brake rod when said trigger is sprung, and a spring connecting the component parts of said trigger and disposed in a plane between said heel and the

plane of said pivot points for yieldingly retaining said parts in set relation.

3. In a phonograph brake, a supporting bracket, a brake rod secured to said bracket, a brake shoe carried by said brake rod, a plate pivotally carried by said supporting bracket, a compound trigger carried by said plate, said trigger comprising separate pivotal levers, the pivots of said levers being in alignment with the pivot of said plate, a heel formed on one of said levers, a prong formed on the second lever for engagement with said heel, the second lever being formed with a notch disposed beyond its pivot point with relation to said prong, a lug formed on the first named lever for engagement with the notched portion of the second lever whereby said levers may be moved part way from normal to set position and then automatically disengaged to permit contact between said heel and prong whereby the movement of the levers to set position is completed, and a spring connecting said levers in a plane between their pivots and their pronged or heel ends whereby said levers are yieldingly retained in set relation.

4. In a phonograph brake, a supporting bracket, a brake rod secured to said bracket, a brake shoe carried by said brake rod, a plate pivotally carried by said supporting bracket, a lever pivoted to said plate, a projection formed on said lever for engagement with the said brake rod, a lug formed on said lever, a heel formed on said lever upon the opposite side of the lever pivot with relation to said lug, a second lever pivoted to said plate in alignment with the pivots of said plate and first named lever, and formed with a notched portion for engagement with the lug of the first named lever, a prong formed on said second lever for engagement with the heel of said first named lever, a finger piece formed terminally of the first named lever whereby it may be raised, when in normal position, to cause the said lug to engage the notched portion of said second lever and move the same a predetermined distance toward set position and then release the same to permit engagement of the said prong of the second lever with the heel of the first lever to move said members into set position, and a spring connecting said levers whereby they are yieldingly retained in set relation.

5. In phonographic braking mechanism, the combination of a rotating element, a support, a plate pivoted to said support, a trigger pivoted to the upper part of said plate and provided with a finger, an actuating arm pivoted to said plate below said trigger and having an engaging shoulder, a spring for normally maintaining said finger and shoulder in engaging position, a brake member mounted on said support provided on its free end with a brake shoe, and a tone arm adapt-

ed to engage said trigger and release said actuating arm to permit said spring to force said actuating arm against said brake member, thus causing the stoppage of said rotating element.

6. In phonographic braking mechanism, the combination of a rotating element, a support, a plate pivoted to said support, a trigger pivoted to the upper part of said plate and having a finger, an actuating arm pivoted to said plate below said trigger and having an engaging shoulder, a spring for normally maintaining said finger and shoulder in engaging position, a brake member mounted on said support provided on its free end with a brake shoe, and a moving element adapted to trip said trigger, thus causing said actuating arm to cooperate with said brake member and force the brake shoe into engagement with said rotating element.

7. In phonographic braking mechanism, the combination of a rotating element, a support, a plate pivoted to said support, a compound trigger carried by said plate, resilient means connecting the component parts of said trigger and normally maintaining such parts in a normal position, a tone arm, and a brake arm normally out of engagement with said trigger and adapted for operative engagement with said rotating element after said tone arm has tripped said trigger.

8. In phonographic braking mechanism, the combination of a rotating element, a support, a plate pivoted to said support, a brake member fastened to said support, a latch pivoted to said plate adapted for engagement with the tone arm of the phonograph and provided with an extension, an actuating arm for said latch provided with a shoulder, a spring connecting said latch and actuating arm, said latch being also provided with a projection for cooperation with a tooth on said actuating arm to cause the proper engagement of said shoulder and extension, said actuating arm when released by said latch serving to force said brake member into contact with said rotating element.

9. In phonographic braking mechanism, the combination of a rotating element, a support, a plate pivoted to said support so as to be brought into different angular positions, a compound trigger, the component parts of which are pivoted to said plate, resilient means connecting the said component parts, and serving normally to maintain such parts in a normal position, a moving element, and a brake arm normally out of engagement with said trigger and adapted for operative engagement with said rotating element after said moving element has engaged said trigger.

10. In phonographic braking mechanism, the combination of a rotating element, a support, a plate pivoted to said support so

as to be brought into different angular positions, means for limiting the angular positions of said plate, a compound trigger, the component parts of which are pivoted to said plate, resilient means connecting said component parts, and serving normally to maintain such parts in a normal position, a moving element, and a brake arm normally out of engagement with said trigger and adapted for operative engagement with said rotating element after said moving element has engaged said trigger.

11. In a phonograph braking mechanism, the combination of a support, a plate adjustably mounted thereon, a brake member, a brake-actuating arm pivoted on said plate, a trigger pivoted on said plate and adapted to lock said arm in inoperative position, and a spring for forcing said arm against said brake member to apply the brake.

12. In a phonographic braking mechanism, the combination of a turntable, a support, a plate pivoted to said support, means for limiting the angular positions of said plate, a trigger pivoted to said plate and provided with a finger, an actuating arm pivoted to said plate having a shoulder and a lug, resilient means for normally maintaining engagement between said finger and shoulder, said trigger having a recess to receive said lug when said actuating arm is lifted, thus permitting said plate, trigger and actuating arm to be moved as a unit into an engaging position with a tone arm, and a brake lever adapted to be forced into engagement with said turntable when said actuating arm is released from said trigger.

13. In a phonographic braking mechanism, the combination of a support, a plate mounted thereon, a trigger and an actuating arm pivoted to said plate and provided with cooperating parts, spring means connecting said trigger and actuating arm for holding said parts in cooperative relation and a brake member adapted to be engaged by said actuating arm and forced into operative position when said trigger is disengaged from said actuating arm.

14. In a phonographic braking mechanism, the combination of a support, a plate mounted thereon, a trigger and an actuating arm pivoted to said plate, spring means connecting said trigger and actuating arm, a brake adapted to be applied by said spring through the intermediary of said arm when said trigger is released, and means coacting with said spring means for restoring said trigger to an operative position when said actuating arm is manually raised to its normal position.

15. In a phonograph braking mechanism, the combination of a support, a plate adjustably mounted thereon, a brake, a trigger, and a brake-actuating arm pivoted on said plate in cooperative relation to said trigger

so that movement of said arm in one direction will adjust said plate and set said trigger to retain said arm and release movement of the trigger will permit reverse movement of said arm to apply the brake.

16. In a phonograph braking mechanism, the combination of a support, a plate adjustably mounted thereon, a trigger and a brake-actuating arm pivoted on said plate, a spring connecting said trigger and brake-arm, and adjustable means for regulating the extent of relative movement between said trigger and brake-actuating arm during the setting operation to thereby determine the promptitude with which said trigger will release said arm.

17. In a phonograph braking mechanism, the combination of a pivotally mounted plate, a trigger and a brake-actuating arm pivoted thereon, an adjusting screw whereby the extent of swinging movement of said trigger on said plate may be regulated, and a spring connecting said arm and trigger and serving to yieldingly hold said trigger in position to lock said arm, and also serving to move said arm into brake-applying position upon movement of said trigger to releasing position.

18. In a phonograph braking mechanism, the combination of an adjustable plate, a trigger and an arm carried by said plate, and a brake member disposed in the path of movement of said arm, so that said brake member will be moved into operative position when said arm is released by said trigger.

19. In a phonographic braking mechanism, the combination of a plate, an arm and a trigger independently pivoted on said plate, a brake member disposed in the path of movement of said arm, and means for actuating said arm when released by said trigger to thereby move the brake member at right angles to the direction of movement of said arm.

20. In a phonograph brake the combination with a support, of spring actuated braking mechanism supported thereby, a trigger to set and release the mechanism and comprising an upstanding member frictionally adjustable into contact with a tone arm at finishing position, a spring for moving said member toward the starting position of the tone arm after said trigger and mechanism have been manually set, and an adjustable stop for regulating the amount of said movement.

21. In a phonograph brake the combination with a support, of spring actuated braking mechanism supported thereby, a trigger to set and release the mechanism and comprising an upstanding member frictionally adjustable into contact with a tone arm at finishing position, a spring engaging the trigger to rotate said member toward the

starting position of the tone arm upon setting said trigger and mechanism, and an adjustable stop engaging the trigger during said adjustment of the upstanding member to limit the subsequent rotation of the trigger.

22. In a phonograph brake the combination with a support, of spring actuated braking mechanism supported thereby, a trigger to set and release the mechanism and comprising an upstanding member frictionally adjustable into contact with a tone arm at finishing position, a spring engaging the trigger to rotate said member toward the starting position of the tone arm upon setting said trigger and mechanism, and an adjustable stop engaging the trigger during said adjustment of the upstanding member to limit the subsequent rotation of the trigger.

23. In a phonograph brake the combination with a braking element, of trigger supporting means, a spring actuated lever for operating said element, a heel on said lever, a trigger pivoted on said support and comprising a prong positioned to contact with the heel to hold said lever in retracted position, an upstanding member for contact with a tone arm, said upstanding member being rotatably adjustable to a given position with respect to the tone arm when said prong and

heel are separated and being spring pressed slightly toward the tone arm from said given position upon contact between said prong and heel, and a screw adjustably fixed in the path of said prong to limit said slight spring pressed movement.

24. The combination of a braking element, means for controlling the position of said element, said means including a member manually adjustable into engagement with a tone arm when in finishing position, means for automatically moving said member toward starting position of the tone arm after said manual adjustment has been effected, and means whereby the extent of said automatic movement may be regulated.

25. The combination of a braking element, means including a manually adjustable trigger for controlling the position of said braking element, a spring arranged to move the tone arm engaging portion of said trigger toward the tone arm of a phonograph after the manual adjustment of said trigger has been effected, and adjustable means whereby the extent of said spring-caused movement may be regulated.

In testimony that I claim the foregoing as my own I have hereto affixed my signature.

JOSEF WITTEK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MOTOR FOR TALKING MACHINES

1,238,454 ----- J.K. Stewart, Dec'd.
Patented - Aug. 28, 1917,
Filed - Aug. 18, 1916.

J. K. STEWART, DEC'D.
J. B. STEWART, EXECUTRIX.
MOTOR FOR TALKING MACHINES.
APPLICATION FILED AUG. 18, 1916.

1,238,454.

Patented Aug. 28, 1917.

Fig. 1.

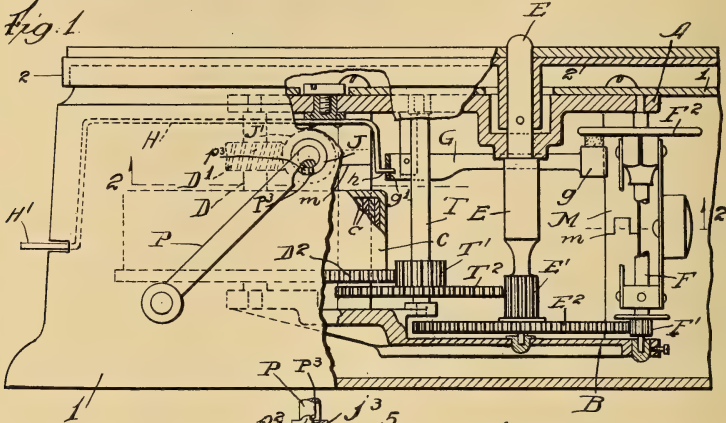


Fig. 2.

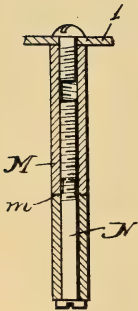
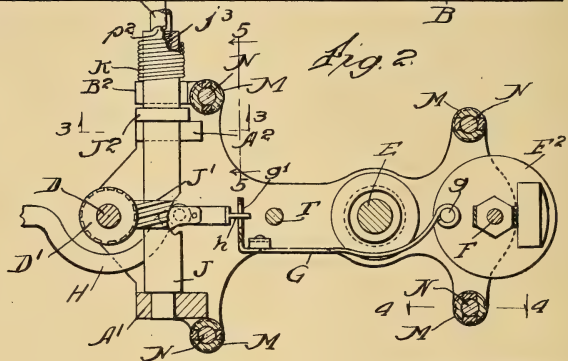


Fig. 3.

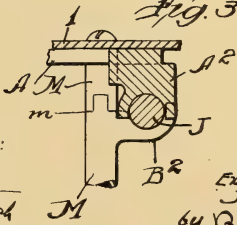
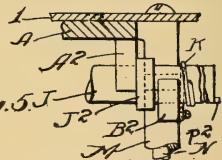


Fig. 4.

Fig. 5.



Witnesses:
[Signature]
Edna M. Macdonald

Inventor:
Julia B. Stewart
Executrix of the Estate of
John K. Stewart, Deceased.
by *[Signature]* Attorney

UNITED STATES PATENT OFFICE.

JOHN K. STEWART, DECEASED, BY JULIA B. STEWART, EXECUTRIX, OF NORTHPORT, NEW YORK.

MOTOR FOR TALKING-MACHINES.

1,238,454.

Specification of Letters Patent.

Patented Aug. 28, 1917.

Application filed August 18, 1916. Serial No. 115,711.

To all whom it may concern:

Be it known that I, JULIA B. STEWART, a citizen of the United States, residing at Northport, in the county of Suffolk and State of New York, am the executrix of the last will and testament of JOHN K. STEWART, deceased, who had invented new and useful Improvements in Motors for Talking-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved spring motor for operating a talking machine. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of a portion of a talking machine comprising the support and the record-carrying table, and equipped with a motor embodying this invention.

Fig. 2 is a section at the line, 2—2, on Fig. 1, being in the plane of the axis of the winding shaft.

Fig. 3 is a section at the line, 3—3, on Fig. 2.

Fig. 4 is a detail section axial with respect to one of the spacing posts of the frame.

Fig. 5 is a detail section taken at the plane indicated by the line, 5—5, adjacent to Fig. 2.

In the structure shown in the drawings, 1, is the support of the talking machine and its motor, 2, is the record-carrying tablet which is mounted upon the spindle or shaft, E, of the motor train. The motor comprises the top and bottom plates, A and B, in which are journaled the parallel shafts of the train extending from plate to plate. C is the spring drum containing the power spring, *c*, secured at its inner end to the coiling shaft, D, and at its outer end to the drum. On the shaft, D, outside the drum there is provided a large spur gear, D¹, which meshes with a pinion, T¹, on the shaft, T, of the train which has a gear T² meshing with a pinion E¹ on the shaft, E, which protrudes through the plate, A, and projects above the support, 1, to receive the record-carrying tablet, 2. On the shaft, E, there is a large spur gear, E², having fine teeth for meshing with the pinion, F¹, on the governor shaft, F. On said governor shaft there is secured the brake disk, F², with which the governor brake, *g*, at the end of the brake arm, G, co-

operates for governing the speed in the well understood manner. The brake arm, G, is pivoted on the frame plate, A, and has at the opposite end from the governor a cam slot, *g*¹, which is engaged by a pin, *h*, on the end of a lever, H, fulcrumed on the frame and provided with a hand piece, H¹, which protrudes outside the support or casing, 1, for manipulation to regulate the speed.

The power-spring-coiling shaft, D, has fast upon it a spiral gear, D¹, which meshes with a coöperating spiral gear fast on the winding shaft, J, which is journaled transversely to the power-spring-coiling shaft, having one journal bearing provided upon a lug, A¹, rigid with the plate, A, and two half bearings, A² and B², opposed to each other, rigid respectively with the plates, A and B. This construction permits the engagement of the winding shaft, J, in its bearing by the approach of the plates, A and B, on the journals of the parallel shafts of the train, and renders it possible to make the winding shaft, J, permanently rigid—and if desired, integral—with the worm gear, J¹, thereon, and also rigid, and if preferred integral, with a stop collar, J², which is positioned so as to stand between the two half bearing lugs so spaced from them as to permit a limited longitudinal movement of the winding shaft in its bearings. The spiral gear engagement between the winding shaft, J, and the power spring coiling shaft, D, operates to a large extent as a lock against the unwinding of the spring by rotation of the coiling shaft; but for desirably rapid winding, the pitch of the spiral gears is such that when the spring is fully wound, the gears might tend to transmit rotary movement from the power spring shaft to the winding shaft in the reverse direction of winding; as a further and final lock against the reverse action of the winding shaft, avoiding pawl and ratchet devices the noise of which would be objectionable, there is provided a spring wire coil, K, coiled tightly about the winding shaft, J, one end of the coil being very tightly gripped frictionally to the shaft, and the other end being engaged with the frame, the direction of coiling being such that the winding action of the shaft, J, tends to relax the coil and rotation in the opposite direction which might be caused by the unwinding of the spring

from the inner end rotating the coiling shaft tends to tighten the coil, so that the coil operates as a friction clutch preventing the reverse or unwinding movement. This spring coil or clutch, K, is secured to the frame at the end of said spring coil away from which the other end of the coil would be pulled by the thrust of the winding shaft which would tend to result from the reaction of the main spring transmitted through the spiral gears, D¹ and J¹; and, as above described the stop collar, J², on said shaft, J, is positioned between the bearings so as to permit a limited end thrust of the winding shaft; and such end thrust, tending to tighten the spring coil clutch, K, on the winding shaft, insures the clutching action of said spring coil to prevent back rotation of the winding shaft; and since the pitch of the engaged spiral gears is such that the reaction of the spring tends to produce the end thrust more readily than it tends to produce rotation of the gear on the winding shaft, this tightening of the coil-spring-clutch on the winding shaft is certain to occur before any rotation of the winding shaft; and thus the grip of the clutch for preventing the rotation is insured.

To facilitate assembling, and at the same time to render the frame very rigid against any distortion tending to carry the opposite journal bearings of the parallel shafts out of alinement, the two plates, A and B, are each provided with four posts, M, projecting toward the opposite plate, the meeting ends of the corresponding posts being matched for tongue-and-groove engagement with each other as shown at, m, the diagonally opposite posts having the tongues parallel and at right angles to the other two diagonally opposite posts, so that disengagement by horizontal movement in any direction is defeated; and these posts are axially bored to receive the bolts, N, which fit within the axial bore and extend through the posts, thus holding them accurately in alinement. The posts of one plate are interiorly threaded for a part of the length of the aperture for engagement of the threaded ends of the bolts for drawing, clamping and securing the opposed plates together with their respective posts properly interlocked at their meeting ends.

A crank, P, is provided for winding up the motor spring, said crank being preferably detachably engageable with the winding shaft, J, such detachable engagement being effected most conveniently by an interiorly-threaded axial bore, p², in the end of the winding shaft, into which the end of the crank shaft is screwed; and to prevent the engagement effected in this manner becoming so tight in the winding process as to prevent the crank from being readily unscrewed from the winding shaft, the thread

at such engagement is preferably made very steeply pitched so that the length of engagement effected by a single turn is sufficient for the length of a shoulder, p², which is formed at the end of the shaft extending radially thereto, said end being shaped spirally about the axis from the base to the tip of said shoulder, the pitch of the spiral being that of said thread; and the crank has a cross pin, P², which travels into engagement with this shoulder in the last turn of the crank in screwing in, and comes into such engagement before the threads are jammed or screwed tightly to each other. Some provision such as this for making it easy to unscrew the crank is necessary, particularly in view of the spring-coiled clutch device, K, which, it will be remembered, is coiled so as to be tightened by the unwinding movement,—that is, by the movement which would unscrew the crank, so that if the crank should hold fast at its threaded engagement with the winding shaft, resisting unscrewing, the entire stress of the force applied for unscrewing it would have to be borne by the anchorage or stopping of the inner end of said spring coiled clutch with the frame, so that eventually that spring coiled clutch would be liable to be wrenched away from the frame or broken. This is prevented by the expedient above described for preventing the crank from becoming screwed tight into the winding shaft.

I claim:—

1. In combination with the opposed plates having shaft bearings for parallel shafts which extend from plate to plate, a bearing on one of said plates for a transversely-extending shaft, and lugs on the respective plates projecting toward each other, each having a half bearing for such transverse shaft; whereby the transverse shaft may be lodged and secured in said bearings by the approaching movement of said plates on the journals of the parallel shafts.

2. In combination with the opposed plates having corresponding journal bearings for parallel shafts which extend from plate to plate; hollow posts projecting from the respective plates toward each other, having at their meeting ends tongue-and-groove engagement with each other, the several posts having their respective tongues-and-grooves extending in horizontal directions part of which are transverse to the other part.

3. In combination with the opposed plates having corresponding journal bearings for parallel shafts which extend from plate to plate; hollow posts projecting from the respective plates toward each other, having at their meeting ends tongue-and-groove engagement with each other, said posts comprising two pairs whose individuals alternate with each other in a circuit, the tongues-and-grooves of each pair extending

in horizontal directions transverse to those of the other pair.

4. In combination with the opposed plates having corresponding journal bearings for parallel shafts which extend from plate to plate; hollow posts projecting from the respective plates toward each other, matched for engagement between each other at their

ends and bolts extending and fitting in the axial cavities of said posts for alining them and drawing and holding them together. 10

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 15th day of August, 1916.

JULIA B. STEWART,

Executrix of John K. Stewart, deceased.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND PRODUCER.

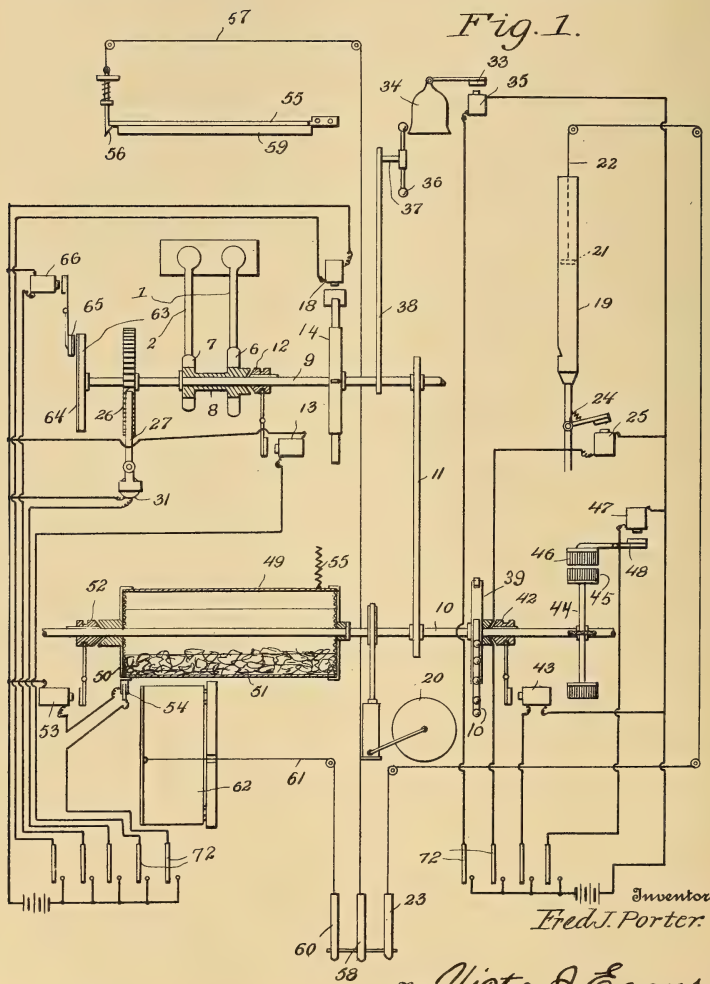
1,238,566 ----- F. J. Porter,
Patented - Aug. 28, 1917,
Filed - Sept. 1, 1916.

F. J. PORTER.
SOUND PRODUCER.
APPLICATION FILED SEPT. 1, 1916.

1,238,566.

Patented Aug. 28, 1917.

3 SHEETS—SHEET 1.

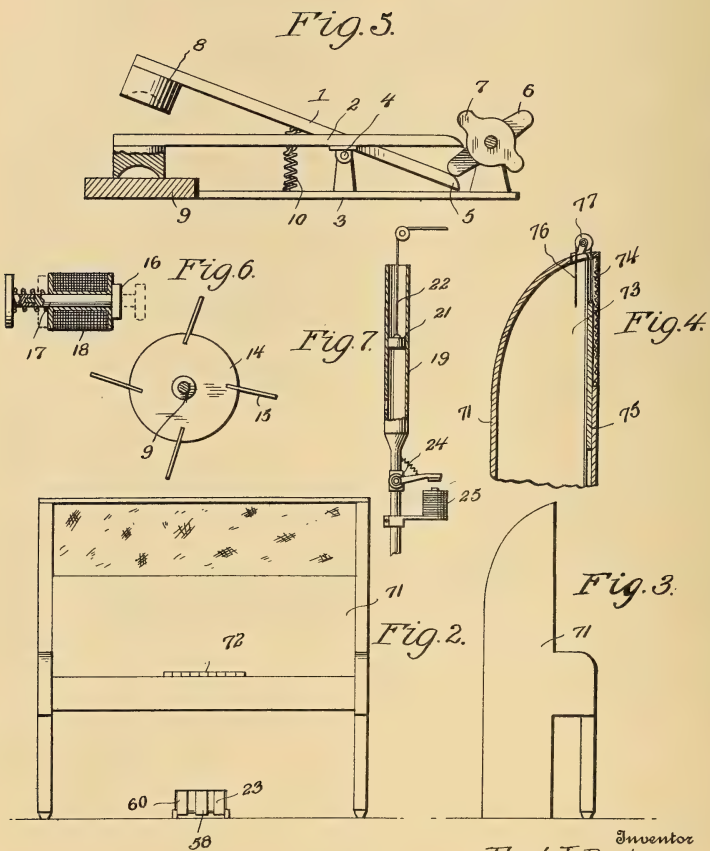


F. J. PORTER.
SOUND PRODUCER.
APPLICATION FILED SEPT. 1, 1916.

1,238,566.

Patented Aug. 28, 1917.

3 SHEETS—SHEET 2.



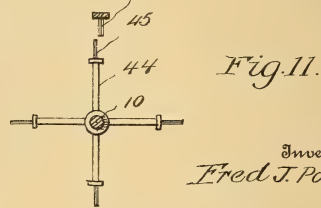
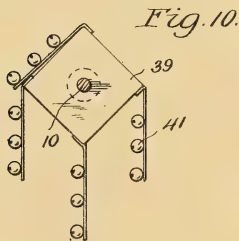
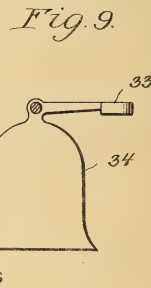
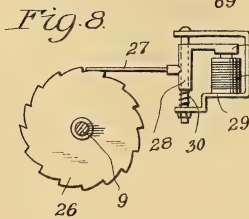
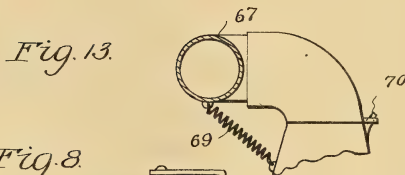
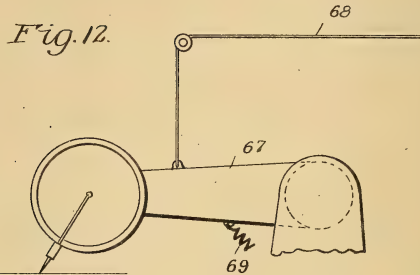
Inventor
Fred J. Porter

By Victor J. Evans

Attorneys

1,238,566.

Patented Aug. 28, 1917.
3 SHEETS—SHEET 3.



Inventor
Fred J. Porter

By *Victor J. Evans*

Attorney

UNITED STATES PATENT OFFICE.

FRED J. PORTER, OF COLUMBUS, OHIO.

SOUND-PRODUCER.

1,238,566.

Specification of Letters Patent.

Patented Aug. 28, 1917.

Application filed September 1, 1916. Serial No. 118,127.

To all whom it may concern:

Be it known that I, FRED J. PORTER, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented new and useful Improvements in Sound-Producers, of which the following is a specification.

In the moving picture art it is often necessary to produce sound in synchronism with the projection of pictures upon the screen.

The primary object of this invention is to accomplish the foregoing result in a manner as to only require one operator.

An object of the invention is the novel manner of associating the sound producing devices with the constantly driven shafts and using an electromechanical means for selectively setting into operation any one of the devices.

Briefly stated my invention consists of a device having a roughened surface co-operating with a movable element for imitating rushing water, water falls, or wind blowing; a device carrying wire brushes for imitating railroad trains or automobiles; a device comprising a ratchet wheel and a movable spring strip for imitating the breaking of boards or the falling of a ceiling; a device consisting of a metallic drum supporting broken material for imitating the breaking of dishes or windows; a bell moving about a pivot so as to be acted upon by a constantly driven hammer; a disk supporting a flexible element adapted to engage a movable independent element for imitating a motor boat, aeroplane, or motor cycle; a device constructed to imitate the trotting of a horse; a miniature door connected so as to be manually closed from a remote point; a talking machine constructed to have the reproducer manually thrown into engagement with the record; a whistle having an adjustable piston for varying the tone qualities; a resilient strip arranged to be tensioned and then liberated for imitating the dropping of an article; sleigh bells arranged to be given rotary motion by one of the constantly driven shafts.

The invention will be better understood from the following detail description taken in connection with the accompanying drawings wherein:—

Figure 1, is a diagrammatic view of the system.

Fig. 2, is a front elevation of a cabinet which will contain the sound devices.

Fig. 3, is a side elevation thereof.

Fig. 4, is a detail view of a modification.

Fig. 5, is a side elevation of a device for imitating the trotting of a horse.

Fig. 6, is a detail view of a device for imitating the sound of an aeroplane.

Fig. 7, is a detail view of a whistle.

Fig. 8, is a detail view of a device to imitate the sound of a falling ceiling.

Fig. 9, is a detail view of the bell.

Fig. 10, is a detail view of a device for imitating sleigh bells.

Fig. 11, is a detail view of a device for imitating a train.

Figs. 12 and 13 are detail views of a portion of a talking machine.

I will first describe the different sound producing devices and then how the devices may be selectively operated by associating and closing the electrical circuits.

The device for imitating the trotting of a horse consists of a pair of arms 1 and 2 pivotally supported on a base 3 as indicated at 4. One end of the arm 1, is beveled as indicated at 5, so as to coöperate with a cam 6, while one end of the arm 2 is similarly shaped so as to coöperate with the second cam 7. At this point I wish to call attention to the fact that the cams are different sizes so as to give different movement to the arms for the purpose of allowing the arms to create sounds of different volume as the sound of the rear hoof of a horse is different from that made by the front hoof. The remaining ends of the arms carry cups 8 adapted to strike a table 9 through the section of the spring 10. As clearly shown in Fig. 1 of the drawing the cams 6 and 7 are connected together by a sleeve 8 that is in turn loosely mounted on an auxiliary shaft 9 that has connection with the main shaft 10 by the belt 11. The sleeve 8 is rigidly connected to the shaft 9 by a clutch that is operated when the magnet 13 is energized.

The device for imitating the sound of an aeroplane consists of a disk 14 loosely mounted on the shaft 9. In the periphery of the disk at spaced points are flexible strips 15. In the path of movement of the strip 15 is a block 16 carried upon the core 17 of the solenoid 18. From this arrangement it will be seen that in the rotation of the disk 14 the strips 15 will successively strike the block 16 when the latter has been moved by the solenoid 18 being energized. A whistle 19 receives its air from a tank 20

by suitable piping shown broken away for clearness, and this whistle is provided with a plunger 21 given movement by a flexible element 22 manually operated by a foot treadle 23. The flow of air from the tank 20 through the whistle is controlled by a valve 24 operated by a magnet 25.

In Fig. 8 the device for imitating the falling of a ceiling consists of a ratchet wheel 26 rigidly secured to the shaft 9 and co-operating with a resilient strip 27 carried upon a sleeve 28 that is in turn slidably supported in a bracket 29. The strip 27 is held out of engagement with the ratchet wheel by a spring 30 acting on the sleeve 28. The strip is moved into engagement with the ratchet against the action of the spring by the influence of a magnet 31 attracting an armature 32 formed upon the sleeve 28.

In Fig. 9, I have shown an armature 33 rigidly secured to a bell 34 at its point of suspension so that when the armature 33 is attracted by a magnet 35 a portion of the bell will be disposed in the path of movement of the constantly rotated hammers 36 carried upon the counter shaft 37 that is in turn driven from the shaft 9 by the belt 38.

In Fig. 10 I have shown a rectangular plate 39 secured to a main shaft 10 that in turn may be driven in any suitable manner. To the corners of this plate I secure the usual sleigh bells 41. Coöperating with the plate 39 is a clutch 42 keyed upon the shaft 10 and operated by a magnet 43.

In Fig. 11 I have shown a device for imitating the sound of a railway train and as shown consists of a bracket 44 rigidly secured to the shaft 10 and this bracket 44 carries wire brushes 45 adapted to successfully strike another brush 46 when the latter is moved in the path of movement of the brushes 45, upon the action of the magnet 47 that acts upon an armature 48 supporting the brush 46. Also loosely mounted on the shafts 10 is a casing 49 having its ends covered by wire mesh 50. Within this casing is a quantity of broken material. This casing is connected to the shaft by a clutch 52 operated by a magnet 53. At this point I wish to call attention to the fact that a switch 54 is arranged in the circuit of the magnet 53 which is arranged to be operated when the casing 49 is given a partial rotation and when this action takes place a coil spring 45 returns the casing to its normal position.

The device for imitating the breaking of a board or similar action consists of a strip 55 having one end rigidly supported while its remaining end is engaged by a spring pressed catch 56 that is in turn operated by a flexible element 57 which terminates in the foot treadle 58. When the strip 59 is given the proper tension it slips off the catch 56 and violently strikes the table or

support 59. A third foot treadle 60 has a flexible connection 61 with a miniature door 62 so that when the treadle 66 is depressed the door will be drawn into engagement with a stationary support for the door.

To complete my invention I secure to one end of the shaft 9 a disk 63 one face of which being roughened or carries a piece of sand paper 64 adapted to engage the block 65 also carrying a strip of sand paper when the latter is given movement by the magnet 66. If found advantageous in practice a talking machine may be used and to allow the machine to be operated from a remote point I connect to the tone arm 67 of the machine a flexible element 68 that may be connected to a treadle similar to those illustrated in Fig. 1. A spring 69 is arranged at such an angle as to move the needle of the reproducer into engagement with the first sound line of the record as clearly shown in Fig. 13. To insure this operation I provide a stop 70 which limits the lateral movement of the tone arm 67.

In Figs. 2 to 4 inclusive of the drawings I have illustrated one form of cabinet that may be constructed to house the devices and in this particular instance consists of a casing 71 having the general outline of a piano with the keys thereof constructed in the form of circuit closers 72, whereby the circuits of the magnets may be selectively closed. The interior of the casing is formed into an intensifying passage 73 the exit of which is closed by a porous material 74 such as a piece of cloth. Slidably mounted in the casing is a gate 75 adapted to obstruct all or a portion of the sound passage 73 so as to give the impression of distance. The gate 75 is operated in any suitable manner such as by a flexible element 76 passing around a pulley 77.

It is to be understood that while all of the several features of my improved apparatus have special coöperations with one another and together constitute a particular effective mechanism for the purpose in view certain of these features may be applied in other relation and I therefore desire to cover the combination present in the several parts of my improved apparatus whether employed in the general organization shown or elsewhere.

It is further understood that the structural embodiment of the invention as a whole and its various features as shown is merely illustrative and not restrictive as I am well aware that many of the details of construction may be widely varied without departing from the spirit of the invention, I therefore desire not to be limited to these particulars or any other except as set forth in the appended claims.

What I claim is:—

1. A sound producer comprising a main

shaft, an auxiliary shaft having a connection with said main shaft, sound generating devices loosely mounted on said shafts and means for accomplishing a rigid connection between said devices and the shafts.

2. A sound producer comprising a main shaft, an auxiliary shaft having a connection with said main shaft, sound generating devices mounted for rotation upon said shaft and electromechanical means for selectively connecting said devices in a rigid manner to said shafts.

3. An apparatus of the class described comprising in combination a main shaft, a casing loosely mounted thereon containing a quantity of broken material, an electrical control clutch for rigidly connecting the casing to said shaft, an auxiliary shaft having connection with said main shaft, a pair of cams loosely mounted on said auxiliary shaft, an electrical control clutch for rigidly connecting the cams to the said auxiliary shaft and a pair of arms given movement by said cams and adapted to strike a suitable support for the purposes set forth.

4. An apparatus of the class described comprising in combination a main shaft, a casing loosely mounted thereon containing a quantity of broken material, an electrical control clutch for rigidly connecting the casing to said shaft, an auxiliary shaft having connection with said main shaft, a pair of cams loosely mounted on said auxiliary shaft, an electrical control clutch for rigidly connecting the cams to the said auxiliary shaft, a pair of arms given movement by said cams and adapted to strike a suitable support for the purposes set forth, a disk rigidly secured to said auxiliary shaft having one of its faces roughened, and electrical mechanical means including a block arranged to be thrown into engagement with the roughened face of said disk.

5. An apparatus of the class described comprising in combination a main shaft, a casing loosely mounted thereon containing a quantity of broken material, an electrical control clutch for rigidly connecting the casing to said shaft, an auxiliary shaft having connection with said main shaft, a pair of cams loosely mounted on said auxiliary shaft, an electrical control clutch for rigidly

connecting the cams to the said auxiliary shaft, a pair of arms given movement by said cams and adapted to strike a suitable support for the purposes set forth, a disk rigidly secured to said auxiliary shaft having one of its faces roughened, electrical mechanical means including a block arranged to be thrown into engagement with the roughened face of said disk, other disks rigidly secured to the auxiliary shaft formed with projections and an electrical mechanical means for disposing an element in the path of movement of the projections.

6. An apparatus of the class described, comprising in combination a main shaft, a casing loosely mounted thereon containing a quantity of broken material, an electrical control clutch for rigidly connecting the casing to said shaft, an auxiliary shaft having connection with said main shaft, cams loosely mounted on the auxiliary shaft, an electrical control clutch for rigidly connecting the cams to the said auxiliary shaft, a pair of arms given movement by said cams adapted to strike a suitable support for the purposes set forth, a disk rigidly secured to said auxiliary shaft having one of its faces roughened, an electrical mechanical means including a block arranged to be thrown into engagement with the roughened face of said disk, other disks rigidly secured to the auxiliary shaft formed with projections, electrical mechanical means for disposing an element in the path of movement of the projections, electrical circuits for all of said electromechanical means and a circuit closer for each circuit.

7. An apparatus of the class described comprising in combination a plurality of shafts having connections with each other, a plurality of sound generating devices loosely mounted on the shafts, electromagnets for rigidly connecting the devices to the shafts an electrical circuit for each magnet, a talking machine the tone arm of which having a connection with a flexible element manually operated and a spring so arranged as to bring about engagement between the reproducer and the record.

In testimony whereof I affix my signature.

FRED J. PORTER.

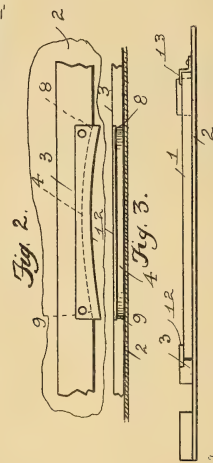
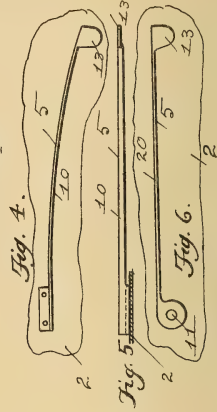
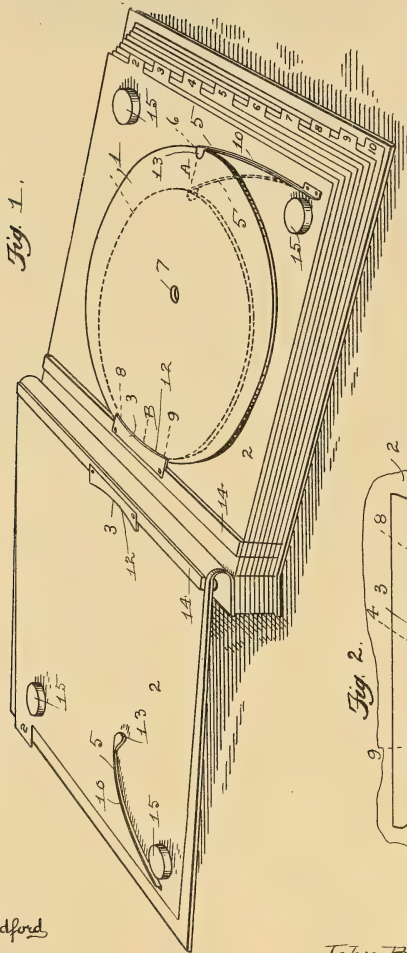
HOLDER FOR PHONOGRAPH RECORDS.

1,238,735 ----- J. B. Barlow,
Patented - Sept. 4, 1917,
Filed - Mar. 28, 1917.

J. B. BARLOW.
 HOLDER FOR PHONOGRAPH RECORDS.
 APPLICATION FILED MAR. 29, 1917.

1,238,735.

Patented Sept. 4, 1917.



Witnesses
 J. B. Bradford

John B. Barlow

By Cyrus W. Rice

his Attorney

UNITED STATES PATENT OFFICE.

JOHN B. BARLOW, OF WALKER TOWNSHIP, KENT COUNTY, MICHIGAN.

HOLDER FOR PHONOGRAPH-RECORDS.

1,238,735.

Specification of Letters Patent. Patented Sept. 4, 1917.

Application filed March 28, 1917. Serial No. 157,867.

To all whom it may concern:

Be it known that I, JOHN B. BARLOW, a citizen of the United States, residing at Walker township, in the county of Kent and State of Michigan, have invented new and useful Improvements in Holders for Phonograph-Records, of which the following is a specification.

The present invention relates to holders for phonograph records; and its object is to provide a simple device of that character wherein such records may be securely held by their edges.

This object is attained by, and the invention finds preferable embodiment in, the structure hereinafter described and illustrated by the accompanying drawings, in which:—

Figure 1 is a view in perspective of a phonograph record holder opened;

Fig. 2 is a fragmentary view showing in plan one of the holding members;

Fig. 3 is an edge view of the same;

Fig. 4 is a plan view of a movable holding member;

Fig. 5 is an edge view of the same;

Fig. 6 is a plan view of a modified construction of the movable member; and

Fig. 7 is an edge view of the base with the holding members and phonograph record held thereby.

The phonograph record 1 is removably held on the base 2 of the holder by oppositely disposed holding members, which are carried by, and extend outwardly from the face of, the base and hold such record on its opposite sides or edges. The first holding member 3, has a concave edge 4 adapted to receive a segmental part of the record, and engage its edge or side at points on the record's periphery at an angular distance apart. The second holding member 5 is movable parallel to the face of the base toward and away from the first member and is adapted to hold such record, at a point on its opposite edge or side, from which point 6 a straight line (as the line A—B of Fig. 1) projected through the record's center 7 passes between the points of the first member's engagement, such points being indicated at 8, 9. Preferably the second member is spring-pressed toward the first member and may consist of the leaf spring as shown at 10 in Figs. 1, 4 and 5; or this second member may be a bar 20 pivotally mounted on the base at 11 as indicated in

Fig. 6. The holding members are shown provided with overhanging portions 12 and 13 respectively, adapted to extend over the outer flat surface of the record to securely hold the same.

Records of different diameters may be held on the base, a larger record being shown in solid lines and a smaller record in dotted lines in Fig. 1, the second member 5 being movable a sufficient distance to hold either. Both sides of the base may be furnished with holding members as shown in Fig. 1.

Filler members 14, 15, extend upwardly from the face of the base a greater distance than the holding members extend upwardly therefrom as particularly shown in Fig. 7, in order to protect the faces of the records from injury by contacting with the record on the adjacent base or with any parts carried by such adjacent base. The bases may be bound together as leaves in a book as shown in Fig. 1.

I claim:

1. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member extending outwardly from the face of the base and adapted to hold such record at one side, and a second member movable parallel to the face of the base toward and away from the first member and adapted to hold such record at its opposite side.

2. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member extending outwardly from the face of the base and adapted to engage such record at one side, and a second member movable parallel to the face of the base toward and away from the first member and adapted to engage such record at its opposite side; said members having overhanging portions adapted to extend over the outer flat surface of such record.

3. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member extending outwardly from the face of the base and adapted to hold such record at one side, and a second member spring-pressed toward the first member parallel to the face of the base and adapted to yieldingly hold such record at its opposite side.

4. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member

extending outwardly from the face of the base and adapted to engage such record at one side; and a second member spring-pressed toward the first member parallel to the face of the base and adapted to yieldingly hold such record at its opposite side; said members having overhanging portions adapted to extend over the outer flat surface of the base.

5 10 15 20 25 30 5. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member extending outwardly from the face of the base and adapted to engage such record at points an angular distance apart on one side thereof, and a second member movable parallel to the face of the base toward and away from the first member and adapted to hold such record at a point on its opposite side from which point a straight line projected through such record's center passes between the points of the first member's engagement.

6. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member extending outwardly from the face of the base and adapted to engage such record at points an angular distance apart on one side thereof, and a second member spring-pressed toward the first member parallel to

the face of the base and adapted to yieldingly hold such record at a point on its opposite side from which point a straight line projected through such record's center passes between the points of the first member's engagement; said members having overhanging portions adapted to extend over the outer flat surface of such record.

7. In a device of the character described; a base; means for holding a phonograph record on the base comprising, a first member extending outwardly from the face of the base and adapted to engage such record at points an angular distance apart on one side thereof, and a second member spring-pressed toward the first member parallel to the face of the base and adapted to yieldingly hold such record at a point on its opposite side from which point a straight line projected through such record's center passes between the points of the first member's engagement; said members having overhanging portions adapted to extend over the outer flat surface of such record; and filler members extending upwardly from the face of the base to a greater distance than said holding members extend upwardly therefrom.

In testimony whereof I have hereunto set my hand.

JOHN B. BARLOW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

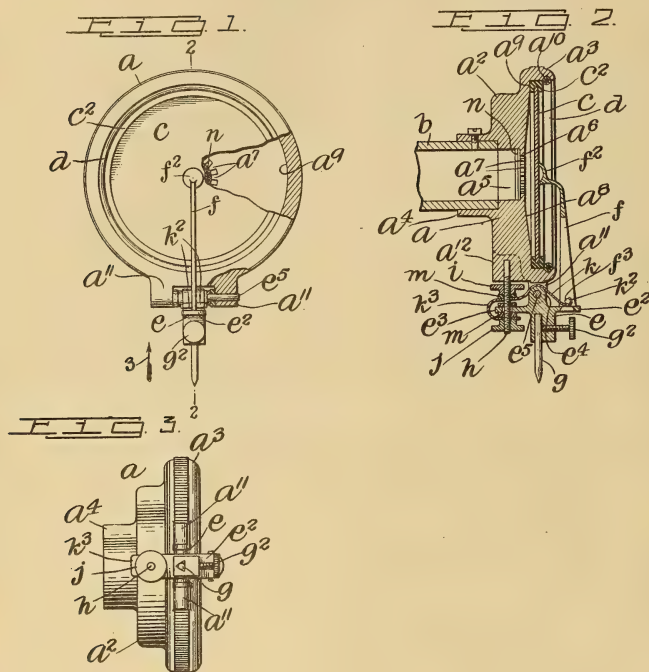
REPRODUCER OR SOUND BOX FOR TALKING MACHINES.

1,239,044 ----- A. H. Ryder,
Patented - Sept. 4, 1917,
Filed - June 20, 1916.

A. H. RYDER.
 REPRODUCER OR SOUND BOX FOR TALKING MACHINES.
 APPLICATION FILED JUNE 20, 1916.

1,239,044.

Patented Sept. 4, 1917.



Inventor
 Arthur H. Ryder,
 By his Attorneys
 Edgar Tate & Co.

UNITED STATES PATENT OFFICE.

ARTHUR H. RYDER, OF BROOKLYN, NEW YORK.

REPRODUCER OR SOUND-BOX FOR TALKING-MACHINES.

1,239,044.

Specification of Letters Patent.

Patented Sept. 4, 1917.

Application filed June 20, 1916. Serial No. 104,690.

To all whom it may concern:

Be it known that I, ARTHUR H. RYDER, a citizen of the United States, and residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Reproducers or Sound-Boxes for Talking-Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to reproducers or sound boxes for talking machines and other machines of this class, and the object thereof is to improve the construction of devices of this class in such manner that the operation thereof or the tone produced thereby will be more smooth and regular and free from metallic vibrations than other devices of this class, and whereby the volume of the tone or the sound produced will be increased or decreased as may be desired, and whereby the reproduced voice will be more distinct and clear than is possible with other devices of this class as now constructed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a front view of a sound box or reproducer made according to my invention with part of the construction broken away;

Fig. 2 a section on the line 2—2 of Fig. 1; and

Fig. 3 a view looking in the direction of the arrow 3 of Fig. 1.

In the practice of my invention, I provide a box or casing *a* comprising a back portion *a*² and a front portion *a*³, and the back portion *a*² is provided with a tubular neck *a*⁴, in which is secured a tube *b* by which the device is connected with the machine in the usual manner, and the tube *b* registers with a central aperture *a*⁵ in the back body portion *a*² at the front of which is an annular flange *a*⁶ provided with teeth *a*⁷ between which are corresponding recesses.

The front part *a*³ of the box or casing is circular in form and forms in connection with the back part a cup-shaped recess *a*⁸ in the annular walls of which is an annular rabbet groove *a*⁹ forwardly of which is a supplemental groove *a*¹⁰ preferably V-shaped

in cross section, and the diameter of which is greater than that of the rabbet groove *a*⁹.

The diaphragm *c* is similar in form to others of its class and on the perimeter thereof is mounted a rubber band or frame *c*², and in assembling the parts, the diaphragm with its band or frame *c*² is inserted into the rabbet groove *a*⁹, after which an annular elastic lock *d* is inserted into the groove *a*¹⁰ and the inner diameter of which is less than the outer diameter of the diaphragm *c* and its frame *c*², and this securely holds the diaphragm and its frame in position. The part *d* is preferably made of tubular rubber through which is passed an elastic metallic wire or rod *d*², but said part *d* may be made in any desired manner.

At one side of the body or casing *a*, preferably at the bottom thereof, are projecting ears *a*¹¹ between which is pivoted a block *e* having a forwardly directed finger piece *e*² and a similar backwardly directed finger piece *e*³, and the vibrator arm *f* which may be of the usual form is provided with a cup-shaped head *f*² which bears on the diaphragm *c* but has no rigid connection therewith, and the arm *f* is riveted or otherwise secured in the finger piece *e*² and is provided adjacent thereto with projecting side or stop pins *f*³.

The block *e* is provided on the side thereof adjacent to the box or casing *a* with a projecting head *e*⁴ and a pivot pin *e*⁵ is passed through the ears *a*¹¹ and through said head *e*⁴ in connecting the block *e* with the box or casing *a*, and the reproducing needle *g* is secured in the block *e* by the set screw *g*² in the usual manner. A threaded pin *h* is secured in a boss *a*¹² on the box or casing or the part *a*² thereof, and on this pin are mounted two adjusting nuts *i* and *j*.

I also provide a plate spring *k* one end of which is forked and connected with the pins *f*³ on the vibrator arm *f*, as shown at *k*², and said spring is bent around the head *e*⁴ of the block *e* between the ears *a*¹¹, and the other end portion thereof is formed into a U-shaped loop *k*³ through both side arms of which the pin *h* passes, and said pin *h* also passes loosely through the backwardly directed finger *e*³ of the block *e*, and placed between the adjusting screws *i* and *j* and the sides of the U-shaped loop *k*³ of the spring *k* and the backwardly directed finger of the block *e* are rubber washers *m*.

I also place in the central aperture *a*⁵ of

the body of the box or casing *a* and closely adjacent to the inwardly directed teeth *a'* or flange *a''* a supplemental diaphragm *n* as indicated in Figs. 1 and 2 of the drawing.

5 One of the chief features of my improvement is in the tensionally supported and tensionally controlled vibrator arm, and means for increasing or decreasing the tension under which said arm operates, as experience
10 has shown that with this construction the character of the reproduced sound may be controlled and made smooth and even in volume, and the metallic effect so common in the operation of devices of this class be
15 almost, if not entirely obviated or prevented.

The object of the supplemental diaphragm *n* and the inwardly directed flange *a'* having the teeth *a'* in front of said supplemental diaphragm is also to regulate and control
20 the character of the sound reproduced, and these parts also operate to produce the desired result by controlling and regulating the passage of the sound waves into and through the tube *b*.

25 With my improvement, the box or casing *a* is formed integral and the means for inserting and securing the diaphragm *c* in position, as shown and described simplifies the assembly and disconnection of the parts of
30 the reproducer or sound box, and while I have shown and described the preferred form or construction of my improvement, my invention is not limited to the use of metallic springs for controlling the operation
35 of the vibrator arm, nor to other details of construction herein shown and described, and changes therein and modifications thereof may be made, within the scope of the appended claims, without departing from the
40 spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

45 1. In a device of the class described, a box or casing, a diaphragm mounted therein, a needle block pivoted to said casing and provided with oppositely directed members, one of said members being provided with a vibrator arm which is adapted to operate in
50 connection with said diaphragm, a spring mounted on said block one end of said spring being adapted to operate in connection with said arm and the other end thereof being

bent around the other member of said block 55 to form a hook-shaped spring and adjusting nuts mounted on the opposite sides of the hook-shaped spring and the member therebetween whereby the tension of the vibrator arm on the diaphragm may be regulated. 60

2. In a device of the class described, a box or casing, a diaphragm mounted therein, a needle block pivoted to said casing and provided with oppositely directed members, one of said members being provided with a vibrator arm which is adapted to operate in connection with said diaphragm, a spring mounted on said block one end of said spring being connected with said arm and the other end thereof being bent around the other 70 member of said block to form a hook-shaped spring, a pin mounted in said box or casing and adapted to pass through said last named member of said block and said hook-shaped spring, and means adjustably mounted on 75 said pin on the opposite sides of said hook-shaped spring and said member therebetween for operating said spring to increase or decrease the tension of said arm on said diaphragm. 80

3. In a device of the class described, a box or casing, a diaphragm mounted therein, a needle block pivoted to said casing and provided with oppositely directed members, a vibrator arm connected with one of said 85 members and adapted to operate in connection with said diaphragm, a spring mounted on said block one end of said spring being forked and connected with said arm and the other end thereof being bent around the 90 other member of said block to form a hook-shaped spring, said last named member and said hook-shaped spring provided with apertures, a pin mounted in said box or casing and adapted to pass through the apertures 95 in said hook-shaped spring and the member therebetween, and adjusting nuts mounted on the opposite sides of said hook-shaped spring and said member for regulating the tension of said arm on said diaphragm. 100

In testimony that I claim the foregoing as my invention I have signed by name in presence of the subscribing witnesses this 2nd day of June, 1916.

ARTHUR H. RYDER.

Witnesses:

C. E. MULREANY,
H. E. THOMPSON.

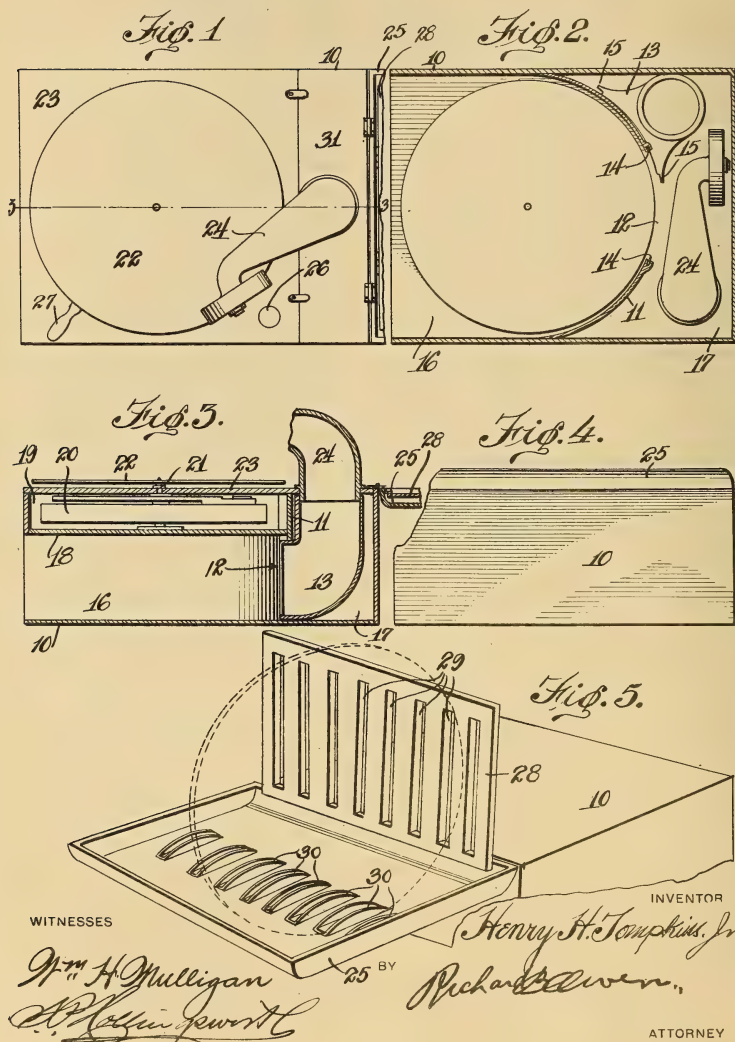
TALKING MACHINES.

1,239,063 ----- H. H. Tompkins, Jr.,
Patented - Sept. 4, 1917,
Filed - May 2, 1916.

H. H. TOMPKINS, JR.
TALKING MACHINE.
APPLICATION FILED MAY 2, 1916.

1,239,063.

Patented Sept. 4, 1917.



UNITED STATES PATENT OFFICE.

HENRY H. TOMPKINS, JR., OF JERSEY CITY, NEW JERSEY.

TALKING-MACHINE.

1,239,063.

Specification of Letters Patent.

Patented Sept. 4, 1917.

Application filed May 2, 1916. Serial No. 94,923.

To all whom it may concern:

Be it known that I, HENRY H. TOMPKINS, JR., a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

This invention relates to talking machines and has for its object to provide a simple and portable article of the kind in which certain portions of the machine may be taken apart and stored within the case to reduce the bulk of the machine and enable it to be packed readily in a suit case, satchel, box or other convenient container.

Another object of the invention is to so form the sound box that space will be afforded therein for storing records when carrying the machine and when not in use.

A still further object of the invention is to provide a cover for the case which when in open position forms a rack to support and carry the records.

With these and other objects in view to be more fully set forth hereinafter, the invention consists in the novel construction, combination and arrangement of parts now to be described and pointed out in the appended claims, reference being had to the accompanying drawing, in which:

Figure 1 is a top plan view of the talking machine with the cover raised,

Fig. 2 is a similar view with the case in section showing the parts disassembled and packed for transportation,

Fig. 3 is a vertical central sectional view on the line 3—3 of Fig. 1,

Fig. 4 is an elevation of the machine, and,

Fig. 5 is a perspective view showing the cover open and arranged to form a rack for supporting records.

In the drawing, 10 indicates the case of a talking machine provided with a vertical partition 11 extending in a substantially semi-circular line across the interior of the casing and having an opening 12 through the lower portion thereof in its middle for the sound passage 13. The edges of the opening 12 are slotted vertically at 14 to receive vertical ribs 15 on the sound passage 13 and maintain the same in proper position and in a firm manner when the machine is assembled for operation.

The partition 11 divides the case 10 into two parts, the larger 16 of which forms the

sounding box and into which the sound passage 13 opens. The other part 17 of the box 10 forms a receptacle to receive the disconnected parts of the machine when packed for transportation as shown in Fig. 2.

The sounding box does not occupy the whole of the space 16 but is divided by a horizontal partition 18 above the outlet of the sound passage 13 into the sounding box proper which is open opposite the partition 11 and the motor box 19 in which is carried the motor 20, usually a spring motor, that drives a shaft 21 on which is mounted the turn table 22 that turns just above the top 23 of the motor box 19.

A tone arm 24 of the usual construction passes through an opening in the top 23 and enters the upper end of the sound passage 13, the parts being fitted to permit easy swinging of the tone arm about its support.

A cover 25 is hinged to one side of the case 10, preferably the side opposite the outlet of the sounding box 16 and covers the turn table 22, speed regulator 26 and brake handle 27 when closed over the case 10, but when open as in Fig. 5, it may extend in a horizontal direction and serve as a support for the records. As shown in Fig. 5, a plate 28 is hinged to the cover at one side and adapted to fold thereinto or be raised in vertical position as in said figure, this plate having a number of vertical slots 29 formed therein which in connection with slots, formed in, or slotted blocks 30 secured to the cover 25 form a series of supports or a rack for maintaining the records A on edge where they will be readily accessible when wanted.

When the talking machine is to be packed for transportation all of the records are placed within the sounding box 16, the tone arm disconnected from the sound passage and a portion 31 of the top 23 raised, thus exposing the compartment 17 of the case. The sound passage is then disconnected from the partition 11 and moved to one side of the opening 12 as shown in Fig. 2 to afford sufficient room for the insertion of the tone arm 24. Any other odds and ends connected with the talking machine may be packed in this compartment after which the section 31 is closed and fastened. The plate 28 is then to be folded into the cover 25 and secured, and finally the cover itself is folded over the case 10. The talking machine is thus reduced to quite small proportions

which may be easily carried from place to place. The parts are few and do not require skill to assemble and disassemble them as anyone capable of operating a machine may do this.

While the specification and drawings describe and illustrate one form of this invention and at the present time the preferred form, it is to be understood that such changes in proportion, design and construction as do not depart from the spirit of this invention are held to be included in the accompanying claims.

I claim:

1. A talking machine comprising a casing divided by a vertical partition into a sounding box in which may be stored records and a packing receptacle for receiving the disassembled tone arm and sound passage when the parts are disconnected for transportation, said partition having an opening therethrough, and fastening means on the margin of the opening for engaging the sound passage to retain the same in operative position.

2. A talking machine comprising a casing divided by a semi-circular vertical partition into a sounding box and a packing receptacle, an opening being formed in said partition, a removable sound passage adapted to be fitted to said opening and a separable tone arm mounted on said sound passage, both sound passage and tone arm adapted

to be packed when disassembled in said packing receptacle.

3. A talking machine comprising a casing divided into two parts by a semi-circular vertical partition extending across the casing and having an opening therethrough, a horizontal partition dividing the larger of said parts into a sounding box and a motor holding box, a removable sound passage and tone arm capable of being assembled in operable position and disassembled to be packed in the smaller of the two parts of the casing.

4. A talking machine casing divided into two parts by a semi-circular vertical partition, a horizontal partition dividing the larger of said parts into an upper motor box and a lower sounding box in which records may be stored for transportation, a sound passage, means on said vertical partition for removably connecting the sound passage thereto, and a tone arm adapted to be separably connected to the upper end of the sound passage and turned therein, said sound passage and tone arm adapted to be disassembled and packed in the smaller receptacle of the casing.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY H. TOMPKINS, Jr.

Witnesses:

ROSS E. MOORE,

JAMES P. McLOUGHLIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINES.

1,239,305 ----- W. S. Samuel,
Patented - Sept. 4, 1917,
Filed Feb. 3, 1915.

UNITED STATES PATENT OFFICE.

WILFRED SAMPSON SAMUEL, OF LONDON, ENGLAND.

TALKING-MACHINE.

1,239,305.

Specification of Letters Patent.

Patented Sept. 4, 1917.

Application filed February 3, 1915. Serial No. 5,907.

To all whom it may concern:

Be it known that I, WILFRED SAMPSON SAMUEL, residing at 32 Worship street, London, E. C., England, Great Britain, have invented a certain new and useful Improvement in Talking-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in gramophones or like talking machines of the type known as the "deflector" or "reflex" type, in which the usual large horn or trumpet is replaced by a deflector opposite to which the conduit or small trumpet leading from the tone arm is situated.

It is well known in connection with talking machines that it is desirable as far as possible that dust and foreign matter should not be allowed to enter the tone arms and fittings. For this purpose it has already been proposed in machines of this character to construct the machine in such a manner that the outer continuity of the connection between the sound-box and trumpet need never be broken.

The object of the present invention is to devise an improved form of machine of the above character, and the invention consists of the combination in a talking machine of the type referred to, of a casing, a cover hinged thereon, a deflector arranged with its axis transverse to said cover, a trumpet secured to said deflector and with one end in alinement with the axis of said deflector, a tone arm universally jointed to the other end of said trumpet and means for retaining said tone arm within the cover when required.

In the accompanying drawing, which illustrates one method of carrying the invention into effect as applied to a gramophone,

Figure 1 is a perspective view showing the gramophone in its open position.

Fig. 2 is an elevation showing the tone arm in the position for closing the cover, and Fig. 2^a is an enlarged side elevation partly in section, of the trumpet and tone arm.

A casing A carrying the motor, etc., and the turn table B has hinged to it a cover C by means of hinges C¹. The cover is maintained in its open position by means of a strut C². A deflector D provided with flanges D¹ is secured in the cover C by screws

E in the manner shown at E¹. The deflector is made of metal, and is bowl shaped, and in face view with the flanges is rectangular. Secured within the bowl of the deflector is a hollow member or short trumpet F, the upper open end of which is positioned a short distance from the bowl and in alinement with its axis. The member F is secured by brackets F¹ as shown. The hollow member is flared at its upper end and the lower end is provided with a hollow T piece G. The member G is held in the member F so as to turn by means of the pin *f* on the trumpet engaging the groove *g* in the member G, and has a cylindrical sleeve G¹ in which the tone arm H has its bearing. The tone arm H is therefore universally jointed with respect to the member or trumpet F. The sleeve G¹ is provided with a slot K, and secured to the tone arm and passing through the slot K is a thumb screw K¹. The tone arm H carrying the sound box L is shaped as shown in Fig. 2 to which position the tone arm can be moved to change a needle or record.

The gramophone when in use is as shown in Fig. 1. When it is desired to close the machine, the tone arm H is moved to the position shown in Fig. 2, where it is housed within the deflector D. It is secured in this position by means of the thumb screw K¹. The cover C can now be closed down. It will be seen that the machine can be closed without detaching the tone arm or sound box.

Various modifications can be made in the manner of carrying this invention into effect. For instance the hollow member or trumpet F can be secured in or near the deflector in any suitable manner other than that shown, and other means of locking the tone arm in position may be employed. The deflector can be made of any suitable material such as wood, papier mâché, vulcanite or the like, and could itself act as a cover.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a talking machine of the type referred to, the combination of a casing, a cover hinged thereon, a bowl shaped deflector mounted in said cover and arranged with its axis transverse to said cover, a trumpet secured to said deflector and with one end in alinement with the axis of said deflector, a tone arm universally jointed to

the other end of said trumpet and means for retaining said tone arm within said deflector when required.

2. In a talking machine of the type referred to, the combination of a casing, a cover hinged thereon, a bowl shaped deflector mounted in said cover and arranged with its axis transverse to said cover, a trumpet secured to said deflector and with one end in alinement with the axis of said deflector, a hollow T piece pivoted to the other end of said trumpet, a tone arm having one end pivoted to said hollow T piece, and means for retaining said tone arm within said deflector when required.

3. In a talking machine of the type referred to, the combination of a casing, a cover hinged thereon, a bowl shaped deflector mounted in said cover and arranged with its axis transverse to said cover, a trumpet secured to said deflector and with one end in alinement with the axis of said deflector, a hollow T-piece pivoted to the other end of said trumpet, a tone arm hav-

ing one end pivoted to said hollow T-piece and means for clamping said tone arm in said T-piece when the tone arm has been moved into the position in which it lies within said deflector.

4. In a talking machine of the type referred to, the combination of a casing, a cover hinged thereon, a bowl-shaped deflector mounted in said cover and arranged with its axis transverse to said cover, a short trumpet within the bowl of and secured to said deflector with one end in alinement with the axis of said deflector, a hollow T-piece pivoted to the other end of said trumpet, a tone arm having one end pivoted to said T piece and a set screw fitted to said tone arm and adapted to project through a slot in said hollow T piece.

In testimony whereof I affix my signature in presence of two witnesses.

WILFRED SAMPSON SAMUEL.

Witnesses:

RIFLEY WILSON,
G. M. SCOTT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC STOP FOR TALKING MACHINES

1,239,335 ----- Le Roy Armitage,
Patented - Sept. 4, 1917,
Filed - Dec. 14, 1916.

LE ROY ARMITAGE.
AUTOMATIC STOP FOR TALKING MACHINES.
APPLICATION FILED DEC. 14, 1916.

1,239,335.

Patented Sept. 4, 1917.

2 SHEETS—SHEET 1.

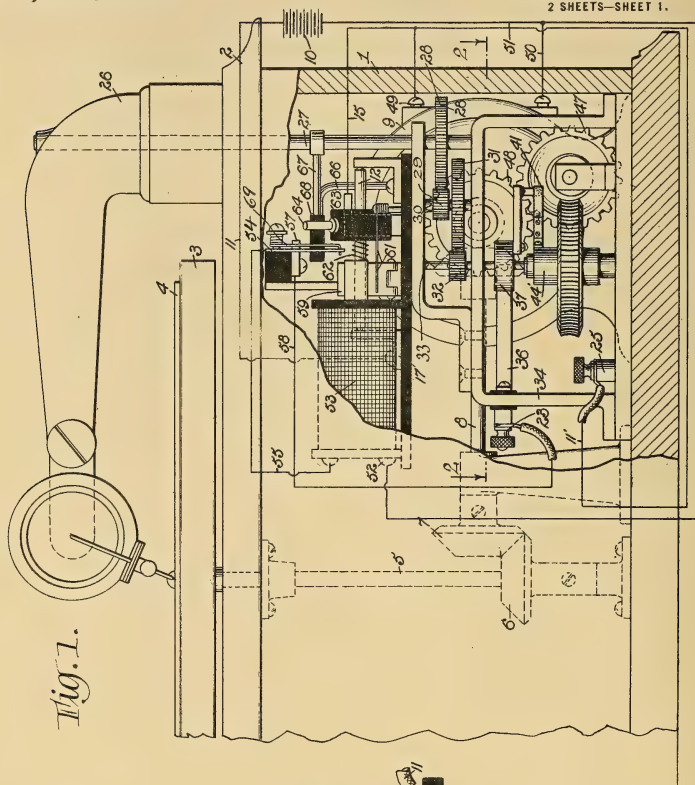


Fig. 1.

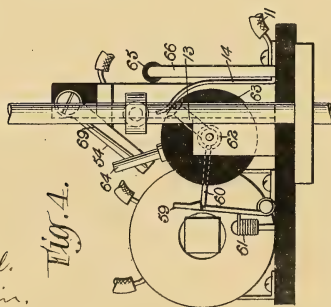


Fig. 4.

WITNESSES

Frederick Wahl.
A. L. Kitchen.

INVENTOR
Le Roy Armitage
BY *M. M. Co.*
ATTORNEYS

LE ROY ARMITAGE.
AUTOMATIC STOP FOR TALKING MACHINES.
APPLICATION FILED DEC. 14, 1916.

1,239,335.

Patented Sept. 4, 1917.

2 SHEETS—SHEET 2.

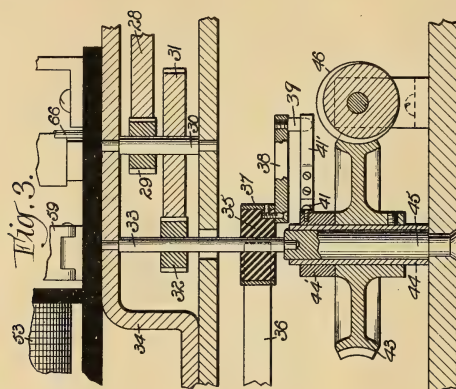
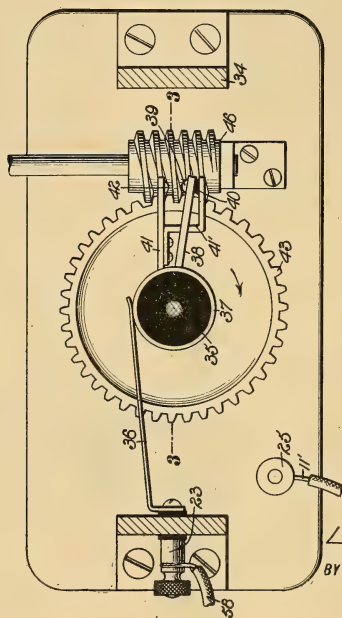


Fig. 2.



WITNESSES

Friedrich Wühl.
A. L. Kitchen.

INVENTOR
Le Roy Armitage
BY *Wm. C. [Signature]*
ATTORNEYS

UNITED STATES PATENT OFFICE.

LE ROY ARMITAGE, OF EAST ORANGE, NEW JERSEY.

AUTOMATIC STOP FOR TALKING-MACHINES.

1,239,335.

Specification of Letters Patent.

Patented Sept. 4, 1917.

Application filed December 14, 1916. Serial No. 136,937.

To all whom it may concern:

Be it known that I, LE ROY ARMITAGE, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented a new and Improved Automatic Stop for Talking-Machines, of which the following is a full, clear, and exact description.

This invention relates to stopping devices for talking machines and has for an object the provision of an improved construction and arrangement which will automatically turn off the power when the end of the sound grooves have been reached.

Another object in view is to provide a simple, effective mechanism for use in electrically driven talking machines whereby the power is shut off as soon as the playing of the record has been completed.

A still further object in view is to provide a mechanism having a pair of contact arms, one of which is operated by the tone arm of the machine and the other by the driving mechanism, whereby when the tone arm stops its swinging movement the contact carried thereby will become stationary so that the other contact driven by the motor may become engaged therewith.

In the accompanying drawings:

Figure 1 is a fragmentary side view of a talking machine, certain parts being broken away for better illustrating the construction.

Fig. 2 is a detail sectional view through Fig. 1 on line 2-2, the same being on an enlarged scale.

Fig. 3 is a detail fragmentary longitudinal vertical section through part of the operating mechanism, the same being taken approximately on line 3-3 of Fig. 2.

Fig. 4 is an end view showing a switching mechanism embodying certain features of the invention.

Referring to the accompanying drawings by numerals, 1 indicates a casing of any desired kind provided with a top 2 on which the usual turn table 3 is mounted, said turn table receiving the record 4. The turn table 3 is connected with shaft 5 by which it is rotated, said shaft carrying a beveled gear 6 meshing with beveled gear 7. The beveled gear 7 is connected with shaft 8, which shaft in turn is connected with the electric motor 9 through any suitable means, as for instance, a pair of beveled gears. Motor 9 is operated by current from a suitable source

10, said current passing from the source 10 through the wire 11, bracket 17 supporting one end of shaft 12, through shaft 12, and from thence to contact bar 13, spring 14 and wire 15 to binding post 49 of the motor. After the current has passed through the motor it passes out wire 50 to the return wire 51 and from thence back to the source of current 10. The return wire 51 extends to the binding post 52 of the magnet 53 so that current entering the winding of magnet 53 may freely pass back to the source of power, the particular circuit for supplying magnet 53 being hereinafter fully described.

It will be noted that the contact bar 13 and spring member 14 form part of the circuit for motor 9 whereby when the parts are in the position shown in Fig. 4 the motor may freely operate and when moved therefrom said motor will be deprived of current. The bar 13 and associated parts, and also the arm 54, form switches for turning on and off the current as may be desired, the action of these members being automatic during the swinging movement of the tone arm 26. A detail description of these members and associated parts will be made after a description of the action of tone arm 26 and mechanism thereof has been made in order that a better understanding of how the tone arm, by its actions, controls the supply of current to the motor and to the magnet 53 which acts with certain other members as a cut-out for the motor circuit.

The tone arm 26 is mounted on top 2 in the usual way so as to freely swing back and forth as may be desired. When the parts are set for playing a record the tone arm may be in what is termed an outer position and gradually swung inwardly to what may be termed an inner position. When the tone arm is in the inner position the needle will be in the circular groove near the center of the record and will, consequently, prevent the tone arm from any further swinging movement, thus causing the shaft 27 connected therewith to remain stationary. It will be noted that the shaft 27 has a back and forth swinging movement equal to the swinging movement of the arm 26, and the shaft 27 is connected firmly to the arm 26 and also to a gear wheel 28 whereby gear wheel 28 is given exactly the same rotary movement as is given to the arm 26. Gear wheel 28 meshes continually with the pinion 29 and by reason of the small diameter of

pinion 29 the same is caused to rotate to a greater extent than the gear wheel 28. The pinion 29 is rigidly connected with shaft 30 to which a comparatively large gear wheel 31 is secured. Gear wheel 31 meshes with pinion 32 rigidly secured to shaft 33. Shaft 33 is journaled in part of the framework 34 and rotates an insulating block 35 which supports the ring 37. Brush 36 at one end is connected with the binding post 23 but is insulated from the frame 34; also the binding post 23 is insulated from the frame 34.

At the opposite end to the binding post 23 the brush 36 contacts with a metallic ring 37 to which an arm 38 is connected, said arm carrying a contact 39. Contact 39 is normally spaced from the contact 42 carried by arm 41, which arm is rigidly secured to the collar 44' which rests on gear 43. An auxiliary arm 41' is connected with arm 41 and carries a stop 40 formed of insulating material against which the arm 38 normally rests during the operation of the machine. The worm gear 43 carries a sleeve 44 loosely mounted on the standard 45. The worm gear 43 is driven by a worm 46, which worm is connected with a gear wheel 47, said gear wheel meshing with gear wheel 48. Gear wheel 48 is connected with the motor 9 in any suitable way, as for instance, by being secured to the shaft of the armature, as shown in Fig. 1. By this arrangement of gears and worms the arm 41 will rotate at a speed proportionate to the speed of the turn table 3 and, consequently, at a speed proportionate to the swinging movement of arm 26. The parts are formed of such a size that though the speed is proportionate as just described the movement of arm 41 will be slightly slower than the movement of arm 38 so that the contacts 39 and 42 will be maintained out of engagement until the tone arm 26 ceases to swing toward the center, whereupon the arm 41 will catch up to arm 38 and the contacts 39 and 42 will be engaged. When this occurs current will flow from battery 10 through the circuit connected thereto, said circuit including the binding posts 23 and 25, the ground, the brush 36, the slip ring 37 and arms 38 and 41. It is to be noted that as arm 38 moves faster than arm 41 the collar 44' will slip to a certain extent on the sleeve 44, said sleeve being rigidly secured in any suitable manner to the gear wheel 43. When the tone arm is brought back to its starting position the collar 44' may slip properly until both arms 38 and 41, as well as arm 41', are substantially properly located. Preferably the tone arm is brought back farther than necessary in order that upon moving again toward the center the arms 38 and 41 will be separated and also the switching mechanism shown in Fig. 4 will be properly

operated, whereby the current to the motor 9 will be switched on and the current to the cut-out magnet 53 will be switched off.

When the contacts 39 and 42 are in engagement (Fig. 2) current will flow for operating the magnet 53 which shuts off the power from motor 9. The circuit for accomplishing this purpose includes wire 51 which extends to contact 52, winding for magnet 53, wire 55, contact arm 54, contact block 57, wire 58 to binding post 23, brush 36, contact ring 37, contact arm 38, contact 39, contact 42, contact arm 41, collar 44' to the ground and from thence to the binding post 25 and wire 11' back to the battery 10. Current flowing in this path will energize the magnet 53 and will cause the same to attract the armature 59 (Fig. 4) normally held against the catch 60 by spring 61. Catch 60 is connected in any suitable manner with the shaft 12 and rotates therewith whereby when the armature 59 is attracted away from catch 60 the catch will move part of a revolution under the action of spring 62 which rotates the shaft 12 until the contact bar 13 is moved out of contact with the spring or brush 14. In fact, the movement of the catch 60, insulating block 63 and shaft 12 will continue until the lug or projection 64 strikes against the insulating sleeve 65 on the post 66. As soon as the contact bar 13 moves out of contact with the brush or spring 14 current is switched off of the motor 9, as this contact bar is part of the circuit of the motor.

All of the power being turned off as just described the parts are in position ready for the tone arm 26 to be moved back to its starting point. When the tone arm has been moved back to its starting point or a short distance therebeyond, current will be automatically turned on to the motor 9 and the circuit of the magnet 53 will be opened so that the motor may drive the proper mechanism for rotating the record until the record has been finished whereupon the circuit of the magnet 53 will be again closed. In moving the tone arm 26 back to a starting point or slightly beyond a starting point, the shaft 27 is moved for part of a revolution for operating gear 28 and associated parts and also for operating the arm 67 which carries an insulating sleeve 68, said sleeve striking the projection 64 and the arm 54 so that both of these members will be swung on their pivots. The swinging of the projection 64 will cause the insulating block 63 and associated parts to be swung until catch 60 is engaged by the overhanging portion of the armature 59, whereby those parts will become automatically locked and prevent a return movement of the catch, shaft 12 and associated parts. A movement of this kind will cause the contact bar 13 to engage the spring or brush 14, whereupon current will

be turned on to the motor 9 and the mechanism for rotating the turn table 3 will be set in motion.

As arm 54 is swung outwardly away from the contact bar 57 against the action of spring 69 the circuit of the magnet 53 will be opened and maintained open until the arm 67 connected with the shaft 27 is moved back a short distance, whereupon the circuit of the magnet 53 will be closed at this point but opened between the contacts 39 and 42, as shown in Fig. 2. A swinging movement from the center of the disk to the starting point will cause the contact arm 38 and associated parts to rotate the contact arm 41 and the collar 44', said collar slipping on the sleeve 44. As soon as the tone arm 26 has been moved to its extreme outer position and then back to the first groove of the record, the contact arm 38 will be moved away from contact arm 41 during such backward movement to the first groove. As the gearing connected with shaft 27 is such as to move the arm 38 slightly faster than arm 41 is moved by the motor 9, these contacts will be maintained out of engagement until the tone arm 26 ceases to swing, whereupon arm 41 will catch up with arm 38 and the contacts 39 and 42 will become engaged, whereupon the magnet 53 will be supplied with current and the armature 59 will be pulled over for releasing the catch 60, thus allowing springs 62 to break the circuits of both the magnet 53 and motor 9 by shifting the position of the contact bar 13 out of engagement with the brush 14. By this construction and arrangement the current will be automatically shut off from the motor and also the cut-off magnet 53 when the record has been completely played. Also the parts are so formed as to automatically turn on the current when the tone arm has been moved to the position which allows the armature 59 to engage the catch 60.

What I claim is:

1. In a device of the character described, the combination with a talking machine provided with a swinging tone arm, a rotating record table and means for driving the table, said means including an electric motor, of a circuit for said motor provided with switching means, a rotatable arm connected with said motor and rotated thereby, a second rotatable arm arranged adjacent the first mentioned arm, an auxiliary circuit connected to said arm whereby when said arms are in contact said circuit will be closed, a magnet arranged in said auxiliary circuit, means operated by the magnet for opening said switching means when the magnet is energized, a train of gears connected with said second mentioned arm, and means for connecting one of the gears of said train to the swinging tone arm of the talking machine, whereby as the tone arm swings said

train of gears will be operated and said second mentioned arm will be rotated, the proportion of the gears in said train of gears being such as to cause said second mentioned arm to rotate slightly faster than the first mentioned arm whereby said auxiliary circuit will be maintained open until the tone arm ceases to swing.

2. In a device of the character described, the combination with a talking machine having a swinging tone arm, of an electric motor for driving the moving parts of the talking machine, a switch arranged in the circuit of said electric motor, an auxiliary circuit provided with means for opening said switch when the auxiliary circuit is closed, and means operable by the tone arm for maintaining said auxiliary circuit open until the tone arm has finished its inward travel during the playing of the record.

3. In a device of the character described, the combination with a talking machine provided with a swinging arm, of electric means for driving the same, and means operated by said arm for shutting off the power from said driving means, said last mentioned means comprising a rod connected with the swinging arm, a train of gears connected with said rod, a shaft rotated by said train of gears, an insulated sleeve carried by said shaft and rotated thereby, an arm carried by said sleeve, a second arm rotated by the motor used in driving the talking machine, the arrangement of said train of gears being such as to rotate the arm connected with said insulated sleeve faster than the second mentioned arm, an electrical circuit connected with the motor for driving the talking machine, a switch arranged in said circuit, an auxiliary circuit connected with said insulated sleeve and with said second mentioned arm whereby when said arms come into contact said second mentioned circuit will be closed, and a magnet energized by current in said second mentioned circuit, said magnet being connected with said switch and arranged to open the switch when energized.

4. In a device of the character described, the combination with a talking machine having a swinging arm and an electric motor for driving the machine, said motor being provided with a circuit having a switch interposed therein, a contact arm rotated by said motor, a second contact arm, means for connecting said second contact arm with said swinging arm, said means including a train of multiple gears formed so as to cause the second mentioned arm to move slightly faster upon the swinging of the tone arm than the first mentioned arm, an auxiliary circuit connected with said arms, and a magnet connected with said switch and designed to open the same when energized, said second mentioned switch being closed when said arms engage.

5. In an electrically driven talking machine provided with a tone arm, an electric motor for driving the machine, a rotatable arm operated by said motor, a second rotatable arm, means for connecting the second rotatable arm with the tone arm, said means being such that the movement of the tone arm from a starting to a finishing position will rotate said second mentioned arm slightly faster than the first mentioned arm, a circuit for said motor, an auxiliary circuit including a magnet and said arms, and means for opening both of said circuits when said magnet is energized.

6. In an electrically driven talking machine provided with a tone arm, an electric motor for driving said talking machine, a circuit for said electric motor, means operated by the tone arm when moved to an inner position for opening said circuit, and means operated by the tone arm when moved to an outer position for automatically closing said circuit.

7. In an electrically driven talking machine provided with a tone arm, a motor for operating said talking machine, a circuit for said motor, said circuit including a switching mechanism formed with a stationary brush and a rockable contact bar, a second circuit including a magnet and a pair of contact arms, means for connecting one of said arms with said motor whereby the same is rotated, means for connecting the other arm with said tone arm, said means including a train of multiple gear of such proportion as to cause the last mentioned arm to rotate slightly faster than the first mentioned arm, a catch for normally holding said contact bar in a position for maintaining the motor circuit closed, an armature operated by said magnet for releasing the catch, and means for moving said contact bar out of engagement with its coacting brush when said catch is released.

LE ROY ARMITAGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

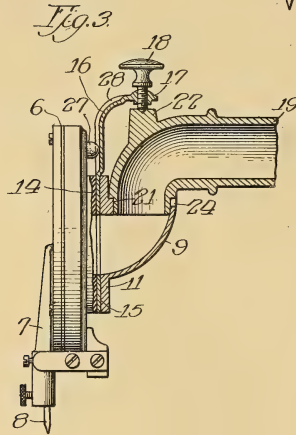
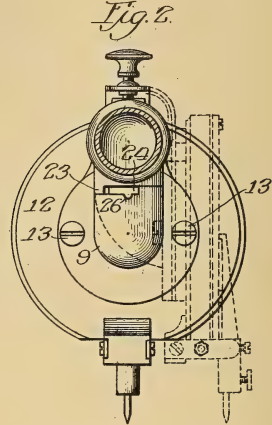
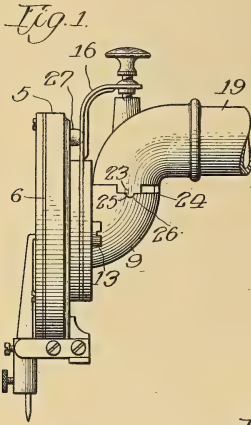
SOUND BOX MOUNTING,

1,239,693 ----- A. A. Huseby,
Patented - September 11, 1917,
Filed - July 19, 1916.

A. A. HUSEBY,
SOUND BOX MOUNTING.
APPLICATION FILED JULY 19, 1916.

1,239,693.

Patented Sept. 11, 1917.



Witnesses:
Ed. Larson
A. J. Sander.

Inventor
Albert A. Huseby
By Pond & Wilson
Attys.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

SOUND-BOX MOUNTING.

1,239,693.

Specification of Letters Patent.

Patented Sept. 11, 1917.

Application filed July 19, 1916. Serial No. 110,042.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Box Mountings, of which the following is a specification.

This invention relates to sound box mountings for talking machines, and has reference more particularly to that type of mountings which permits the sound box to be adjusted in position so as to play records of either the vertically cut or the laterally cut type.

The object of my invention is to provide means for automatically and yieldably locking the sound box in both of its adjusted positions so that it will be rigidly retained against displacement and will be prevented from rattling or vibrating so as to set up undesirable vibrations which would impair the tone of the machine.

Figure 1 is a side elevation of a portion of a tone arm with a sound box attached thereto, in accordance with my invention;

Fig. 2 is a view looking toward the left in Fig. 1, the sound box being shown in dotted lines in the position which it assumes when adjusted to play records having lateral undulations of the sound groove; and

Fig. 3 is a view similar to Fig. 1, certain portions being shown in section.

Referring to the drawings, reference character 5 indicates generally a sound box of well known general construction comprising the customary diaphragm 6, pivotally mounted vibrating lever 7 and needle or stylus 8 mounted in the lower end of the lever. The rear wall of the box is provided with a sound-conducting tube 9 in the form of an upturned elbow which is provided at its base with a flange 11 secured to the rear wall 12 of the sound box by screws 13 or other suitable fastening means. To absorb vibrations between the sound box and the elbow a rubber gasket or washer 14 is interposed between the flange 11 and the rear wall of the sound box, and a circular member 15, corresponding in shape to the flange 11 and the gasket 14, is clamped between this flange and the gasket by fastening screws 13 and has an upward extension 16 terminating in a tapped head 17 in which is threaded a clamping screw 18 for a purpose which will be later described.

The tone arm 19, a fragment only of the outer end of which is shown on the drawings, is of elbow shape at its extremity and is reduced in size upon its outer periphery, as indicated by 21, so as to snugly but rotatably fit within the upper end of the elbow tube 9. It will be manifest from Fig. 3 that the elbow 9 and the sound tube form a continuous sound passage through which the air vibrations are transmitted from the sound box to the horn or other amplifying device (not shown) of the machine.

In order to prevent the sound box from becoming disengaged from the tone arm the crown of the elbow on the tone arm is provided with an upwardly extending boss 22 having a depression in its top forming a seat to receive the lower end of the clamping screw 18. When the parts are assembled and this screw is tightened up the sound box will be firmly clamped to the tone arm without any extensions or projections through or into the sound passage which might interfere with the sound vibrations and the tone of the machine. This connection between the tone arm and sound box since the screw 18 is disposed in axial alignment with the center of the joint between the tone arm and the sound box permits rotative movement of the sound box relatively to the tone arm from the position shown in full lines to that shown in dotted lines in Fig. 2, thus adapting the device to both types of records.

For the purpose of limiting the swinging movements of the sound box relatively to the tone arm to an arc of approximately 90 degrees, the lower end of the tone arm is provided at one side with a shoulder 23 and the upper edge of the elbow 9 is provided with an elongated recess 24 in which the shoulder 23 is adapted to travel, the swinging movement of the sound box being limited in each direction by abutment of the shoulder 23 against one end or the other of the recess 24.

For the purpose of automatically locking the sound box in its adjusted positions the lower edge of the shoulder 23 is provided with a small projection 25 and the recess 24 is provided near each end with a correspondingly shaped depression 26 into which the projection 25 snugly fits when the sound box is adjusted to either of its working positions. The member 16 which is made of sheet metal or other similar material is

sufficiently resilient to permit a slight separation of the joint between the tone arm and sound box which enables the projection 25 to travel upwardly out from the locking depression 26 when force is applied to the sound box to swing it about its pivot. It will be obvious that the tension of the member 16 may be regulated by adjusting the screw 18, which is always set sufficiently tight to make a snug joint, and prevent vibration between the sound box and the tone arm. To further lend rigidity to the structure the rear wall of the sound box is provided near the top with a rearwardly projecting stud 27 which snugly fits into a groove 28 formed in the face of the extension 16, this extension being, for purposes of economy, preferably stamped so as to form a groove therein, as shown.

It will be manifest from the foregoing that I have provided a sound box mounting which is strong, durable and rigid, is relatively cheap to manufacture and serves to hold the sound box firmly united to the sound tube without any extension through or into the sound passage, and which also permits the sound box to be adjusted from a position parallel with the tone arm to a position at right angles thereto, so that the instrument can be used in connection with both types of records by simply adjusting the position of the sound box. The details of construction illustrated and described are

obviously capable of considerable modification and variation without departing from the essence of the invention as defined in the following claims:

I claim:

1. In a sound reproducing machine, the combination of a tone arm, a sound box constructed to rotatably engage the outer end of said arm, means outside the sound passage for holding said sound box in operative relation to said tone arm but permitting relative rotative movement between said arm and box, and cooperating means on said arm and sound box for yieldably locking said sound box at the end of its adjusting movement in each direction.

2. In a sound reproducing machine, the combination of a tone arm having a reduced outer end provided with a shoulder, a sound box having an elbow telescopically and rotatably engaged with said end of the tone arm, said elbow having an arcuate recess to receive said shoulder, means for preventing disengagement of said sound box from said tone arm, and means comprising a projection and a correspondingly shaped depression formed on the opposed faces at the junction of said tone arm and the sound box whereby said sound box is locked in adjusted position with relation to the tone arm.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CABINET FOR TALKING MACHINES

1,239,774 ----- F. A. Dennett,
Patented - Sept. 11, 1917,
Filed - Dec. 1, 1915.

F. A. DENNETT.
CABINET FOR TALKING MACHINES.
APPLICATION FILED DEC. 1, 1915.

1,239,774.

Patented Sept. 11, 1917.

Fig. 2.

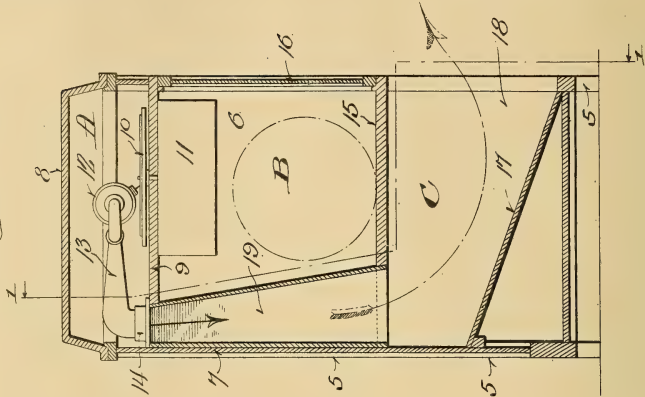
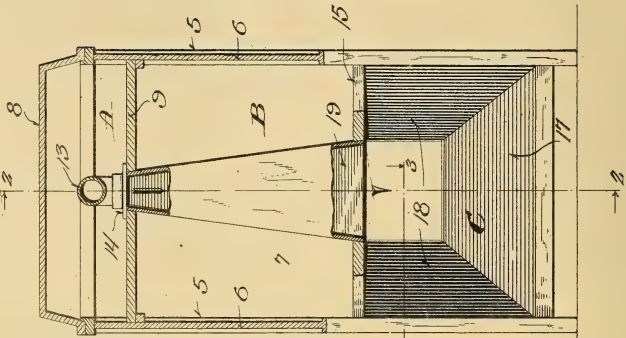


Fig. 1.



Witness:
Charles J. Gray

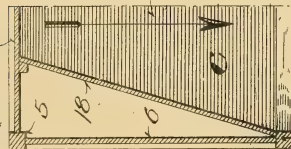


Fig. 3.

Inventor:

Fred A. Dennett
By *Edw. C. Young*
Attorney

UNITED STATES PATENT OFFICE.

FRED A. DENNETT, OF PORT WASHINGTON, WISCONSIN, ASSIGNOR TO WISCONSIN CHAIR COMPANY, OF PORT WASHINGTON, WISCONSIN.

CABINET FOR TALKING-MACHINES.

1,239,774.

Specification of Letters Patent. Patented Sept. 11, 1917.

Application filed December 1, 1915. Serial No. 64,401.

To all whom it may concern:

Be it known that I, FRED A. DENNETT, a citizen of the United States, and resident of Port Washington, in the county of Ozaukee and State of Wisconsin, have invented certain new and useful Improvements in Cabinets for Talking-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention refers to talking machine cabinets, and it has for its object to provide a cabinet of this character wherein a chamber adapted for use as a sound amplifier is so constructed and arranged that parts of said chamber are formed by the cabinet elements.

Another object of my invention is to so construct the cabinet as to provide a compartment for storing suitable records, which features are constructed with a view to simplifying the manufacture and cost of production.

Reference is had to the accompanying drawings wherein similar characters of reference designates corresponding parts throughout the several views and in which:

Figure 1 is a vertical sectional view on the line 1—1 of Fig. 2.

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1 through the lower horn portion.

Referring now more particularly to the accompanying drawings, 5 designates the corner uprights of the cabinet body of the machine, 6 designates the side panels, 7 designates the back panel, and 8 designates the hinged cover which is adapted to inclose the playing compartment A, this compartment being divided from the major portion of the cabinet by a top partition 9 which carries the turn-table 10 driven by the spring motor 11 carried under the compartment. The usual sound box 12 is provided on a movable tube arm 13, which is angular in shape and is connected to the sleeve 14 at the central portion of the back of the partition. Disposed across the cabinet slightly below its middle is a lower partition 15 dividing the major portions of the cabinet into a record storage compartment B, and a horn chamber C, disposed therebelow, the compartment B being closed by a door 16 and the front of the chamber C being shown as open, al-

though it may be closed by a grille or other foraminous structure in a conventional manner.

As shown, the upper and lower partitions 9, 15 are apertured in juxtaposition to the back panel 7 of the cabinet and these apertures are connected by a series of plates which, in conjunction with the back panel 7 form a vertically disposed throat chamber.

A continuation or mouth portion of the chamber 19 is formed by the plates 17, 18 which plates are adapted to abut the back panel 7 to form a horizontally disposed mouth section of the chamber 19, it being understood that the side plate 18 also abut the lower face of the partition 15. Hence, it will be seen that the vertical and horizontal sections of the panel together are adapted to be used as an amplifier and that they are so arranged in conjunction with the cabinet partitions and panels that said parts are utilized to complete the structure. In brief, the amplifier panels just described are an integral part of the cabinet, parts of which cabinet are utilized to form parts of the sound chamber.

Furthermore, by constructing a talking machine cabinet in the manner just described, it will be manifest that all metal parts are dispensed with, and the built-in horn chamber being preferably composed of wood panels will tend to soften the tone to the desired degree.

I claim:

A cabinet for talking machines comprising back and side panels, upper and lower partitions spaced apart to form a compartment, the partitions being apertured in juxtaposition to the cabinet back panel, a series of plates connecting the partition apertures and associated with the cabinet back panel to form a vertically disposed throat chamber, and a second series of plates associated with the lower partition and the aforesaid cabinet back panel to form a horizontal continuation of the throat chamber, the said chamber being adapted for use as an amplifier.

In testimony that I claim the foregoing I have hereunto set my hand at Port Washington, in the county of Ozaukee and State of Wisconsin.

FRED A. DENNETT.

COMBINED TALKING AND PICTURE PROJECTING MACHINE

1,239,800 ----- A. Luciano

Patented - Sept. 11, 1917,

Filed Dec. 31, 1914.

A. LUCIANO.
 COMBINED TALKING AND PICTURE PROJECTING MACHINE.
 APPLICATION FILED DEC. 31, 1914.

1,239,800.

Patented Sept. 11, 1917.

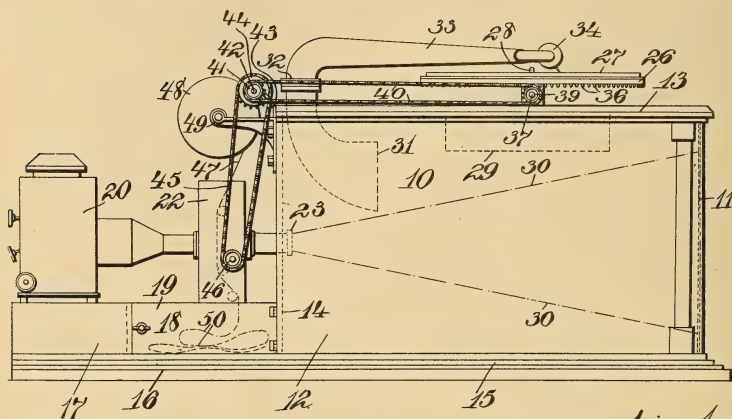


Fig. 1

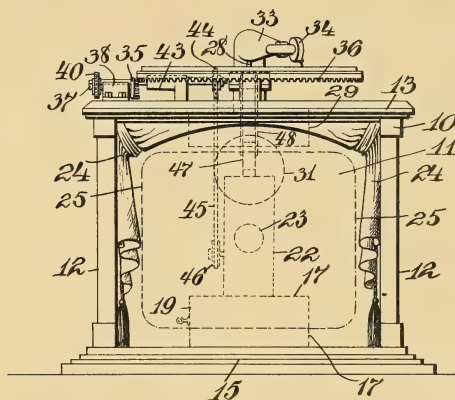


Fig. 2

WITNESSES:

M. A. Johnson.
 H. C. Crutcher.

INVENTOR

A. Luciano,
 BY
 Dykes & Campfield,
 ATTORNEYS

UNITED STATES PATENT OFFICE.

ACHILLE LUCIANO, OF SILVER LAKE, NEW JERSEY.

COMBINED TALKING AND PICTURE-PROJECTING MACHINE.

1,239,800.

Specification of Letters Patent.

Patented Sept. 11, 1917.

Application filed December 31, 1914. Serial No. 879,911.

To all whom it may concern:

Be it known that I, ACHILLE LUCIANO, a subject of the King of Italy, and a resident of Silver Lake, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Combined Talking and Picture-Projecting Machines, of which the following is a specification.

This invention relates to an improved machine that is adapted to reproduce sound and also motion pictures, the sound being adapted to be projected toward a person sitting in front of the screen on which the pictures are reproduced, and means for operating the talking machine and the motion picture machine in a manner to provide for their being synchronized.

The invention is further designed to provide a casing that is of different sizes and can be made of a size to fit on a table of ordinary dimensions and thus be adapted for house use, or it can be made in larger sizes and thus utilized in places of amusement and the like, and it can be made in any particular form so as to facilitate its movement, shipping and transportation, and still insure the relative position of the different parts of the mechanism, this also, if desired, obviating the necessity of dismantling or taking apart the device in order to ship it or to move it about.

The invention is further designed to provide a machine of this kind in which the motion picture machine is conveniently located for the operator's attention and supervision, the motion picture apparatus and the lamp which is usually inclosed in the lamp-house being also arranged to be adjusted for focusing and other purposes, and the motion picture machine is also in position to have its films inserted, and similar preparations or operations made in connection therewith, without opening the casing.

The invention is further designed to provide a machine to project motion pictures and sound reproductions through the screened end of the casing, the casing being provided with a record-rotating device which also is driven by a suitable mechanism which acts as a driving means for the motion picture machine, the driving means being of any desired form, but the preferred form consists of chains and sprockets with their necessary shafts so as to provide a positive non-slipping connection which will in-

sure the synchronizing of the two moving parts of the apparatus, namely the record-rotating device and the motion picture machine.

The invention is illustrated in the accompanying drawing, in which one embodiment of my invention is shown, but it will be understood that changes may be made in the particular arrangement of the parts and their proportions, and also any ornamental features of the invention, without departing from the scope of the invention.

In said drawing, Figure 1 illustrates a side view of the machine embodying the principles of my invention, and Fig. 2 is a front view of the apparatus or machine shown in Fig. 1.

The machine shown in the drawing comprises a casing 10 which can be of any reasonable size, either portable or fixed, being adapted to be made for use on tables or the like, or made larger in size and in the nature of a permanently placed structure. The casing is substantially light-tight except at its front end which is provided with a screen 11 of linen or any other translucent material adapted to receive a picture on one side, which picture can be seen from the other side of the screen. The casing has side walls 12, a top 13 and a back wall 14, and is made of any suitable material, being preferably made of wood although sheet metal can also be employed in making the casing. A base 15 supports the casing and in the form of machine shown it extends beyond the back of the casing as at 16 and acts as a support for the motion-picture machine or other light-projecting amusement device. The part 16 of the base is preferably provided with a stand or box which can be provided with a part 18 to receive films and the like, being provided with a door 19. The light-projecting device, such as a gas lamp or an electric light, is not shown in detail and is usually concealed in a lamp-house 20 adjustably mounted on the stand 17 and having a means, such as 21, for projecting light through the machine 22 which may be a stereopticon or other similar apparatus, the drawing, however, showing a motion-picture machine with a light-projecting part 23 thereon, which part 23 is so disposed that it sends the light on the back of the screen 11. The screen 11 can be suitably ornamented, one form of ornamentation being shown at

24 which represents a miniature stage draping, but it will be evident that other forms of ornamenting the screen can be used with a view, however, to leaving the space within the line 25, for instance, for the field of the picture or pictures to be presented.

On the top of the casing 10 is a record-rotating device, the drawing illustrating one for a disk record, although other forms can be used. It consists of a platen 26 to receive a record 27, the platen being mounted on a shaft 28 driven from a suitable motor conveniently placed, the motor 29 being preferably located within the casing on the under side of the top 13 and out of the path 30 of the light from the machine 22.

A sound conveying means is provided to direct suitable dialogue, monologue or music, for the picture shown on the machine, the said means being placed so that the spectator can distinctly hear the sounds. The machine shown has a sound-conveying means consisting of a horn 31 placed within the casing and directed toward the back of the screen 11. The horn extends through the top 13 and has a bearing 32 for the pivoted tube 33 having on its end the reproducer 34.

To synchronize the record-rotating device and the picture machine, I connect them by means of a non-slipping operative connection which is illustrated in the drawing as consisting of a pinion or gear 35 which is driven by the teeth 36 of the platen 26. The pinion 35 is fastened on a shaft 37 rotating in a bearing 38, the shaft 37 having a sprocket 39 thereon, which sprocket drives a chain 40 which in turn drives a sprocket 41 on a shaft 42 which rotates in a bracket 43. On the shaft 42 is a sprocket 44 which drives a chain 45 which drives a sprocket 46 on the picture machine 22, and this sprocket 46 is connected up with the mechanism of the machine 22 so as to operate the picture films, slides, etc., so as to have them produced in time with the sound from the record. In the form shown, a film 47 is shown mounted on a reel 48 on a bracket 49 on the back of the casing, the film passing through the machine and being deposited in the box 18 as shown at 50, although other means, such as the ordinary rewinding device, can be used to take care of the film that has passed through the machine 22.

The machine has positive synchronizing apparatus that does not slip and can be depended upon. The machine is compact and substantial and can be operated by one person; the amount of attention required being very little.

Having thus described my invention, I claim:

1. In a combined talking and picture pro-

jecting machine, a casing of box-like form with an open front, a screen in said front and adapted to have the major portion of its surface utilized for projection purposes, the top of the casing forming a support, a record supporting and rotating device on the support so provided, a sound-conveying means extending within the casing and bent forward to direct sound directly at and through the screen, said projecting sound-conveying means being toward the rear of the casing to permit a comparatively large sound outlet without getting within the line of divergent rays in said casing, and a motion picture machine at the back of the casing and directing its light rays on the back of the screen.

2. In a combined talking and picture projecting machine, a box-like casing with an open front, a screen closing said front, a motion picture machine at the rear of said casing so that the rays from the machine diverge within the casing, a record support and rotating device on the upper side of the top of the casing, a motor on the under side of said top, and a horn to convey sound from the record and having its outlet end projecting within the casing and forwardly directed at the rear of the inside of the casing, said horn and motor being thus arranged so as not to interfere with the light from the picture machine.

3. In a combined talking and picture projecting machine, a box-like casing with an open front, a screen closing said front, a motion picture machine at the rear of said casing so that the rays from the machine diverge within the casing, a record support and rotating device on the upper side of the top of the casing, a motor on the under side of said top, a horn to convey sound from the record and having its outlet end projecting within the casing and forwardly directed at the rear of the inside of the casing, said horn and motor being thus arranged so as not to interfere with the light from the picture machine, and means for operating the picture machine from the record rotating device.

4. In a combined talking and motion picture machine, a casing having an open front and a small opening in the back, a screen in the open front, a motor within the casing, a horn within the casing, both the horn and the motor being out of the line of light between the small opening and the edge of the screen, a motion picture machine with its light projecting partly into the small opening of the casing, a record supporting device on the casing and driven from the motor, a reproducer connected to the horn, and a connection between the record rotating device and the picture machine for operating the picture machine.

5. In a combined picture projecting and sound reproducing machine, a casing having an open front, a screen disposed across said opening, a picture projecting machine in the rear of the casing adapted to project a picture onto the screen, and a sound reproducing device supported by the upper wall of the casing and having a horn adapted to direct the sound waves downwardly

into the casing and forwardly toward the 10 screen.

In testimony that I claim the foregoing, I hereto set my hand, this 29th day of December, 1914.

ACHILLE LUCIANO.

Witnesses:

M. A. JOHNSON,
H. TRAUTVETTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING-MACHINE,

1,240,038 ----- F. J. Empson,

Patented - Sept. 11, 1917,

Filed - Dec. 31, 1912.

F. J. EMPSON.
TALKING MACHINE.
APPLICATION FILED DEC. 31, 1912.

1,240,038.

Patented Sept. 11, 1917.

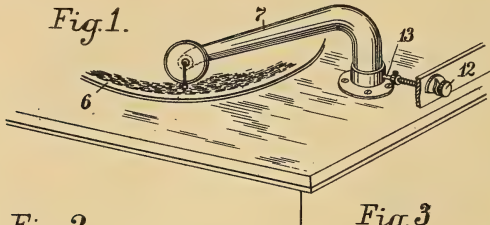


Fig. 2.

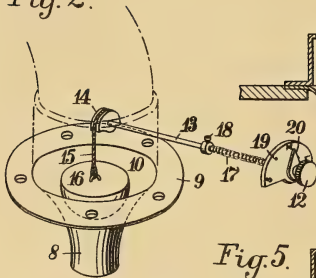


Fig. 3.

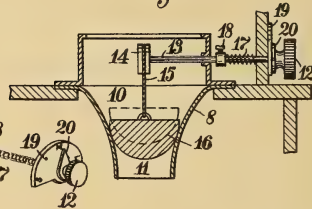


Fig. 5.

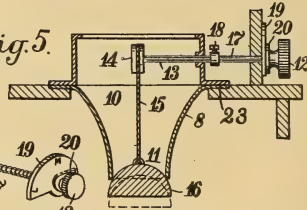


Fig. 4.

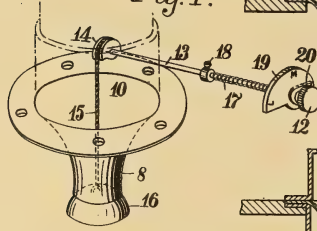
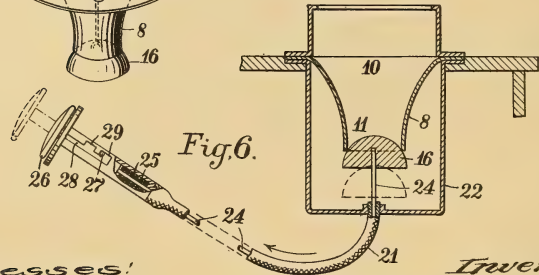


Fig. 6.



Witnesses:
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Inventor
Frederick J. Empson
James L. Norris
Attorney

UNITED STATES PATENT OFFICE.

FREDERICK J. EMPSON, OF SYDNEY, NEW SOUTH WALES, AUSTRALIA, ASSIGNOR TO
THE AEOLIAN COMPANY.

TALKING-MACHINE.

1,240,038.

Specification of Letters Patent.

Patented Sept. 11, 1917.

Application filed December 31, 1912. Serial No. 739,521.

To all whom it may concern:

Be it known that I, FREDERICK JAMES EMPSON, a subject of the King of Great Britain, residing at Sydney, New South Wales, Australia, have invented new and useful Improvements in Talking-Machines, of which the following is a specification.

This invention relates to improvements in talking machines and has been devised with the object of improving and controlling the reproduction of the sound waves.

The said invention consists in the combination with a flexible throat or tube (for example of rubber) situated at the junction of the tone-arm and horn, of a valve or plug to control the sound waves passing through said throat or tube and prior to reaching the horn, and means for operating said plug or valve from the exterior of the machine so that the operator during the rendering of a piece by the instrument may have complete control over the sound waves and be thus enabled to impart to the sound waves desirable light and shade or expression and thus control the sound in a much more effective manner than has been heretofore possible.

The plug or valve is preferably hemispherical and capable of being raised or lowered in the throat passage or to or from the end of its smaller aperture. One mode of raising and lowering the plug is by means of a milled head or thumb nut outside the tone arm on which head is a spindle carrying a light wheel or a section of one immediately over the center of the throat. The wheel or sectional wheel has attached thereto a fine silk or other suitable flexible connection to the other end of which is secured the plug. Rotation of the milled head in one direction causes the wheel or sectional wheel to revolve carrying the thread and consequently raising the position of the plug in the throat while rotation in the opposite direction causes the plug to descend, the passage for the sound waves being widened or contracted accordingly. A suitable spring on the spindle retains it and therefore the plug in the position desired. Another mode of raising and lowering the plug or valve is by means of a Bowden wire mechanism as will be hereinafter described.

In the accompanying drawings:

Figure 1 is a general perspective view.

Fig. 2 an enlarged detailed perspective view, and

Fig. 3 a sectional elevation illustrating the invention.

Figs. 4 and 5 are respectively a perspective and a sectional elevation illustrating a slight modification, and

Fig. 6 illustrates a modified method of raising and lowering the plug or valve.

The same numerals indicate the same or corresponding parts.

6 is the record and 7 the tone arm carrying the usual reproducing needle. 8 is the flexible throat having the flange 9, flared mouth 10, and restricted aperture 11. 12 is a milled head on a spindle 13 on which is a sectional wheel or the like 14. To said wheel is attached one end of a thread 15 at the lower end of which is a plug or valve 16. The spindle 13 is furnished with a spring 17 which while allowing of the free adjustment of the spindle by the operator will retain the spindle, and the plug in any position in which it is left by the operator. 18 is an adjusting screw. The plug is preferably rounded off on one side as illustrated. 19 represents an indicator and 20 a pointer to show the position of the plug in the throat.

By rotating the milled head 12 it is evident that the plug 16 may be raised or lowered in the throat 8 to control the volume of sound passing therethrough.

In the modification illustrated in Figs. 4 and 5 the plug 16 is caused to be raised toward or lowered from the throat aperture.

Referring to Fig. 6 which illustrates a Bowden wire mechanism for actuating the plug or valve, the end of the flexible casing 21 of the Bowden wire mechanism is supported by a U-shaped frame 22 which has a ring 23 adapted to be held in place by the tone-arm 7. The wire 24, on one end of which is mounted the valve 16, is controlled by a spring 25 within the casing 21, the said spring being arranged to force the wire longitudinally within the casing in a direction indicated by the arrow, thereby holding the valve normally open. The outer end of the wire is provided with a thumb piece 26 and it will be seen that with a wire of suitable length the operator can sit with the audience in front of the machine and at the same time control the valve by pressing or releasing the thumb piece.

If desired means may be provided for locking the wire so that the valve may be retained in the closed or one or more intermediate open positions; such means may conveniently comprise a pin 27 projecting from the wire 24 and adapted to slide in a slot 28 in the side of the casing 21. The slot 28 is provided with notches 29, and it will be seen that if the thumb piece is pressed so as to bring the pin 27 opposite one of the notches and then turned so that the pin engages therewith the wire will be retained against the action of its spring.

The preferred form of the device is the convex valve cooperating with the delivery end of the throat, the effect being that the sound-waves, in striking against the valve, are not baffled or reflected back into the throat to interfere with the succeeding waves, but are merely deflected through the adjustable annular space between the valve and the lip of the throat, whence they pass freely into the surrounding space and out by way of the horn.

The valve of my sound controlling device, cooperating, as it does, with a port having a thin, elastic periphery, can be closed with a variety of degrees of tightness. This, by giving corresponding gradations to the tone, tends to prevent the opening and closing of the valve from being abruptly noticeable to the listener. Further, because the port is so delicately elastic, it does not grip the valve. This is advantageous because if the valve be forcibly gripped by its port, it tends to pop out suddenly when trying to withdraw it, and will produce a sudden, abrupt effect in spite of the fact that the intention may have been to withdraw it gradually to produce a smooth crescendo.

What I claim is:

1. In a sound controlling device, the combination with a sound conduit of a plug valve cooperating with a ported member whose port has a thin rubber lip.

2. In a sound controlling device, the combination with a sound conduit of a plug valve cooperating with a ported member whose port has a thin yielding periphery.

3. In a sound controlling device, the combination with a sound-conduit of a valve cooperating with a ported member whose port has a thin rubber lip.

4. In a sound controlling device, the combination with a sound-conduit of a valve cooperating with a ported member whose port has a thin yielding periphery.

5. In a sound controlling device, the combination with a tone-arm and horn of a valve movable into and away from a ported member whose port has a thin yielding periphery, said ported member being in the form of a tubular throat arranged to project the sound from the tone arm into the

horn without having its sides at said port in contact with the sides of the horn.

6. In a sound controlling device, the combination of a cooperating throat and taper plug valve opposed to the sound-waves, the initial contact between said throat and valve being on a thin elastic periphery which permits the valve to be seated lightly, and after that with gradually increasing degrees of tightness to give a correspondingly gradual modulation to the sound as distinguished from an abrupt open and shut effect.

7. In a sound controlling device, the combination with a tone-arm and horn of a valve movable into and away from a ported member whose port has a thin yielding lip, said ported member being in the form of a tubular throat arranged to project the sound from the tone arm into the horn and which has a reduced cross-section at its delivery end.

8. In a sound controlling device, the combination with a sound conduit of telescoping valve parts which contact with each other on a thin yielding periphery.

9. In a sound controlling device, the combination with a sound conduit of cooperating valve parts, one of which has a thin yielding portion which initially contacts with the other valve parts.

10. In a sound-controlling device, the combination with a sound-conduit, of a throat mounted within said conduit so that the sound will pass therethrough and a plug valve in the conduit outside the throat cooperating axially and internally with the mouth of the throat.

11. In a sound-controlling device, the combination with a sound-conduit, of a throat mounted within said conduit so that the sound will pass therethrough and a plug valve in the conduit outside the throat cooperating axially and internally with the mouth of the throat, said mouth being elastic with a thin lip.

12. In a sound-controlling device, the combination with a sound-conduit, of a throat mounted within said conduit so that the sound will pass therethrough and a plug valve in the conduit outside the throat cooperating axially and internally with the mouth of the throat, said mouth being elastic with a thin lip and the cooperating face of the plug valve being tapered.

13. In a talking machine the combination of a tone-arm, a flexible tube situated at the larger end of the tone-arm, a valve to control the sound waves passing through said tube, a spindle, a wheel mounted thereon, a flexible connection connecting the said wheel and the said valve, and means for externally operating the spindle for the purpose set forth.

14. In a talking machine the combination of a tone-arm, a flexible tube situated at the

larger end of the tone-arm, and having a flared mouth at one end and a restricted aperture at the other end, a valve coöperating with the lower edge of the restricted aperture of the said flexible tube to control the sound waves passing therethrough, a spindle, a wheel mounted thereon, a flexible connection connecting the said wheel and

the said valve, and means for externally operating the spindle for the purpose set forth. 10

FRED J. EMPSON.

Witnesses:

ALEXANDER W. ALLEN,
GEORGE HARRISON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

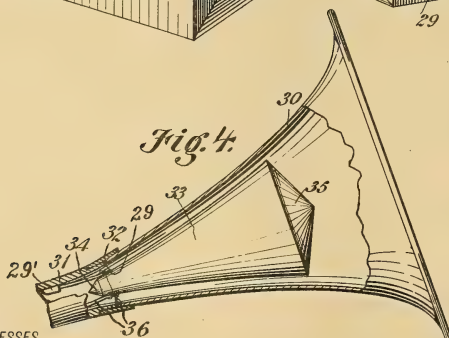
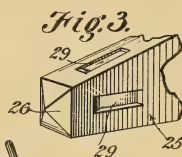
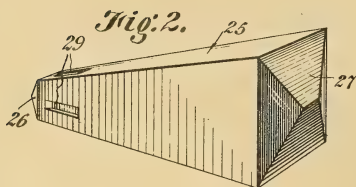
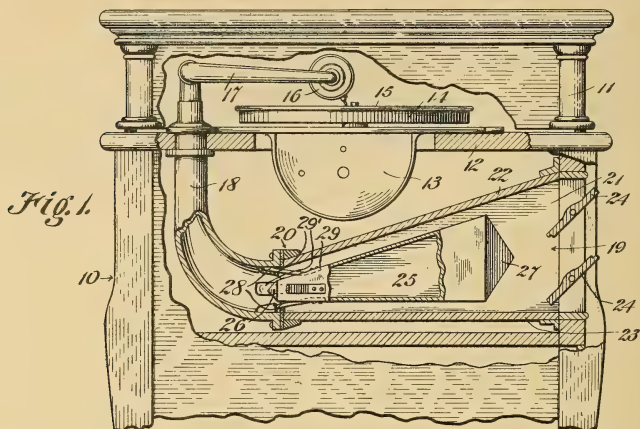
SOUND CLARIFIER FOR SOUND PRODUCING OR
REPRODUCING INSTRUMENTS.

1,240,050 ----- C. W. Johnson,
Patented - Sept. 11, 1917,
Filed - March 14, 1914, Renewed Feb. 27.1917,

C. W. JOHNSON.
SOUND CLARIFIER FOR SOUND PRODUCING OR REPRODUCING INSTRUMENTS.
APPLICATION FILED MAR. 14, 1914. RENEWED FEB. 27, 1917.

1,240,050.

Patented Sept. 11, 1917.



WITNESSES

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UNITED STATES PATENT OFFICE.

CORREL WELTON JOHNSON, OF NEW YORK, N. Y.

SOUND-CLARIFIER FOR SOUND PRODUCING OR REPRODUCING INSTRUMENTS.

1,240,050.

Specification of Letters Patent.

Patented Sept. 11, 1917.

Application filed March 14, 1914, Serial No. 824,703. Renewed February 27, 1917. Serial No. 151,377.

To all whom it may concern:

Be it known that I, CORREL W. JOHNSON, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Sound-Clarifier for Sound Producing or Reproducing Instruments, of which the following is a full, clear, and exact description.

This invention relates to improvements in sound producing or reproducing instruments that require a chamber or box to amplify the sound produced or reproduced, and more particularly to improved means cooperative with the amplifying chamber and sound conveyer for the purpose of clarifying the sound emitted.

A further object of the invention is to clarify the sound or tone resounded from an amplifying chamber, box or horn by eliminating counter currents or interfering eddies within an amplifying chamber, box or horn across or on the line of its axis, at the small end in such a manner as to assist in relieving the sounds of inharmonious tones or flatness and reverberations out of harmony with the sound sought to be produced or reproduced, as well as to allow space in the large end of the chamber for amplification of the sound emitted.

A further object of the invention is to provide a sound clarifier consisting of a deflector of novel structure or shape located in the amplifying chamber and adapted to uniformly divert the sound waves transmitted upon the molecules of the air as an elastic body, and to intercept the counter currents or eddies in the axis of the amplifying chamber and thereby prevent inharmonious sounds.

With the above and other objects in view, the invention resides more particularly in the peculiar combination and arrangement of parts to be hereinafter more fully described, illustrated and claimed, it being also an object to provide a device which is simple in construction, durable and efficient in operation and not likely to get out of working order.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a fragmentary elevation partly in section of a gramophone illustrating one

application of the improved sound clarifier to a musical or sound reproducing instrument;

Fig. 2 is a detail perspective view of a 60 deflector forming the improvement;

Fig. 3 is a fragmentary perspective view looking toward the opposite end of the deflector; and

Fig. 4 is a side elevation partly in section, of an amplifying chamber or horn of different cross section from that shown in Fig. 1, provided with a modified form of sound clarifier.

In carrying out my invention I have illustrated two embodiments, and in Fig. 1 the numeral 10 indicates a fragmentary portion of the cabinet of a gramophone or other suitable musical instrument, usually provided with a hinged cover 11 for protecting the mechanism and preventing the escape of the sound except through the amplifying chamber. The top of the cabinet is indicated by the numeral 12 and serves to support a suitable drive mechanism 13 for rotating a table 14 upon which a sound record in the form of a disk 15 is carried. A reproducer or sound box 16 cooperates with the sound record through the instrumentality of the usual needle or stylus to convey the sound through a movable connection 17 and thence through an inverted sound conveyer 18 suitably supported by the top or partition wall 12. This sound conveyer is gradually enlarged toward its outlet in the same manner as the connection 17 and has its lower end horizontally extended for connection to the restricted end of an amplifying chamber, box or horn 19, also contained in the cabinet. In the form shown, the amplifying chamber is connected to the sound conveyer as shown at 20, the sound conveyer being provided with a flange secured to a connector on the amplifying chamber with interposed means such as a packing or washer of rubber or felt to prevent the transmission of vibrations to the amplifying chamber.

In the structure illustrated the amplifying chamber is of substantially frusto-pyramidal shape in outline and comprises the outwardly deflecting side walls 21, an inclined top wall 22 and a horizontally disposed bottom wall 23, thus providing a chamber which is restricted at its inner end to conform in size to the adjacent end of the sound conveyer and which enlarges out.

wardly in such a manner as to amplify and transmit the sound produced or reproduced. At the front of the chamber the usual pivoted dampers 24 may be provided, but the structure thus described is not specifically claimed as a part of my invention. The sound clarifier forming the invention is indicated by the numeral 25 in the form shown in Figs. 1, 2 and 3 of the drawings, and embodies a deflector having a shape substantially that of a frustum of a pyramid and conforming in cross section to the cross section of the amplifying chamber and uniformly tapering in the same degree in which the chamber tapers. The deflector is preferably hollow or in the form of a shell having four flat sides with one side horizontally disposed in the same manner as the bottom wall 23 of the amplifying chamber, and has its inner end corresponding to the apex of a pyramid, abruptly tapered as shown at 26 in diamond point or pyramidal shape. The end of the deflector corresponding to the base of a pyramid is also provided with abruptly tapered walls producing a hipped or arrised base 27 for a purpose to be hereinafter more fully described.

In use, the deflector 25 is positioned in the amplifying chamber in such a manner as to cause its tapered end 26 to protrude through the aperture of the sound conveyer, the said deflector being removably supported in position by means of a support independent of the amplifying chamber itself. In the illustrated embodiment, four or any other number of brackets 28 are secured in recesses 29 in the side walls of the deflector, the same forming supports which are fitted into sockets 29' formed with or carried by the inner wall of the sound conveyer, so as to offer the least possible resistance to the passage or transmission of the sound waves not desired to be retarded in producing the clear sound primarily sought. These brackets are also connected to the sound conveyer and for this purpose extend through the mouth of the latter so that the deflector is supported with its apex extending slightly into the sound conveyer and centrally of the aperture thereof. The surrounding walls of the deflector are parallel to the inner walls of the amplifying chamber, thus producing a surrounding channel of uniform width so that the sound waves will be uniformly deflected by the apex or tapered end of the deflector around the latter. The outgoing sound waves tend to produce inharmonious sounds due to interfering eddies and disturbances in the body of air supporting the said sound waves, but this is overcome by the installation of the deflector in the axial line of the amplifying chamber, the plain, smooth and polished surface of the deflector avoiding obstruc-

tion so as to increase the volume of sound waves in the space between said deflector and amplifying chamber or horn with resultant clarified tone.

This structure permits a free escape of the sound wave and eliminates any cross or eddy currents which may disturb the clearness of the tone and the amplification of the sound emitted.

While in the structure just described the bottom wall is horizontally extended or disposed and the top wall inclined with the deflector correspondingly shaped, the essential feature consists in conforming the deflector to the amplifying chamber in such a manner as to cause a uniform deflection of the sound from the apex of the deflector into the space around the same. To further carry out the object to be attained, the deflector is provided with the hipped or arrised base 27, the apex and arris of the abruptly tapered extremities of the deflector being located intermediately the edge walls of the adjacent ends of the deflector, in the former case to secure a uniform deflection, and in the case of the hipped or arrised base 27 to assist in the emission of the sounds and the amplification of the same due to the termination of the deflector short of the large end of the amplifying chamber.

In the form of the invention illustrated in Fig. 4 of the drawings a horn or amplifying chamber 30 is shown, the same being of circular cross section and being attached to a sound conveyer or coupling part 31 through the instrumentality of a suitable connector such as a sleeve 32, for the purpose of preventing the transmission of vibrations from the sound conveyer to the horn. The deflector is indicated by the numeral 33 and in the form shown is a frustum of a circular cone the apex 34 of which is tapered to a greater degree than the cone proper, as in the case of the deflector 25 heretofore described. The base 35 of the cone forming the deflector 33 is also oppositely tapered with respect to the taper of the cone and apex, the same as the hipped or arrised base 27 of the quadrangular pyramid 25, and in both instances the bases terminate short of the enlarged extremities of the amplifying chambers or horns so as not to interfere with the proper amplification of the sound and to avoid any possible contention that the device interferes or detracts from the appearance of the machine. The deflector 33 is supported by brackets 36 which are attached to the deflector at certain ends and at their other ends to the inner wall of the sound conveyer 31, the essential feature being to support the deflector independently of the horn or amplifying chamber as in the previously described structure.

In summarizing it will be seen that each

form of the invention illustrated, as illustrating several modifications which might be made without departing from the spirit of the invention, consists in constructing
 5 the deflector on lines corresponding to those of the inner walls of the amplifying chamber, box or horn, or similar in cross section or substantially so, so as to produce a symmetrical surrounding space. The deflector
 10 may be constructed of wood, metal, celluloid, papier-mâché or vulcanized rubber as shall be found most desirable in connection with a certain instrument.

Having thus described my invention, what
 15 I claim as new and desire to secure by Letters Patent is:—

1. A sound clarifier for a sound producing instrument having an amplifying chamber and a sound conveyer of tapered formation, said clarifier comprising a deflector
 20 terminating in a point and positioned in said chamber and projecting into the conveyer to uniformly deflect the sound waves between it and the walls of the chamber.

25 2. The combination with a horn of a sound producing instrument tapering in one direction and a sound conveyer connected thereto; of a deflector positioned in the horn and having oppositely tapered ends, the
 30 deflector forming a space of uniform width between it and the horn and having one end extending partially into the sound conveyer.

3. The combination with a musical or
 35 sound producing instrument having a sound conveyer and an amplifying chamber coupled thereto; of a sound clarifier positioned in the amplifying chamber to produce a surrounding space and being of symmetrical
 40 cross section, said clarifier having oppositely tapered ends one of which extends into the mouth of the sound conveyer, and means connecting the sound conveyer and clarifier for supporting the latter within the
 45 amplifying chamber.

4. A sound clarifier for the amplifying box of a sound producing instrument, embodying a tapered deflector in the form of a shell, the apex and base of the deflector being abruptly tapered.

5. A sound clarifier, comprising a tapered deflector of rectangular cross section and having its apex formed by triangular faces
 50 extending from the sides to a point and having a hiped or arised base.

6. The combination with a sound box of rectangular cross section and tapering toward its inlet end; of a sound clarifier embodying a substantially pyramidal shell
 60 supported in the box to deflect the sound waves uniformly there-around, said shell be-

ing entirely closed, provided with tapered ends and terminating short of the mouth of the box and serving to prevent interference, counter-currents or eddies due to the reverberation of the sound waves resulting from
 65 oscillation of the air molecules transmitting the sound, whereby the sound is strengthened, amplified and tensified and the tone clarified so that all flatness and sounds out
 70 of harmony with the sounds sought to be produced are eliminated.

7. The combination with a sound conveyer and a horn coupled thereto; of a tapered deflector supported in the horn and
 75 having its extreme end portions tapered in opposite directions at a greater degree than the normal taper of the deflector, and brackets carried by the sound conveyer to which the deflector is secured for supporting
 80 the latter spaced from the walls of the horn.

8. A sound clarifier comprising a substantially pyramidal member of quadrangular cross section, the sides of the member
 85 terminating in oppositely tapered walls producing tapered end portions.

9. The combination with a horn of a sound reproducing instrument, said horn tapering in one direction; of a deflector fitted
 90 in the horn and having oppositely tapered ends with one end projecting slightly through the small end of the horn and the other end terminating adjacent to the large end or mouth of the horn.

10. The combination with a musical or sound producing instrument having a sound conveyer and an amplifying chamber coupled thereto; of a sound clarifier positioned
 100 in the amplifying chamber to produce a surrounding space of uniform width and being of symmetrical cross section with respect to the amplifying chamber and internal means for supporting the clarifier within the chamber independently of the latter at spaced
 105 points and permitting the convenient application and removal thereof in a proper position.

11. The combination with a horn of a sound producing instrument tapering in one
 110 direction and a sound conveyer connected thereto; of a deflector positioned in the horn and having oppositely tapered ends with one end extending partially into the sound conveyer.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CORREL WELTON JOHNSON.

Witnesses:

JOHN E. BURCH,

PHILIP D. ROLLHAUS.

UNIVERSAL SOUND REPRODUCER AND ARM.

1,240,267 ----- L. Taxon,
Patented - Sept. 18, 1917,
Filed - Feb. 7, 1917.

L. TAXON,
UNIVERSAL SOUND REPRODUCER AND ARM.
APPLICATION FILED FEB. 7, 1917.

1,240,267.

Patented Sept. 18, 1917.
2 SHEETS—SHEET 1.

Fig. 1.

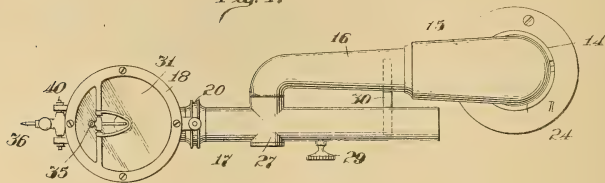


Fig. 2.

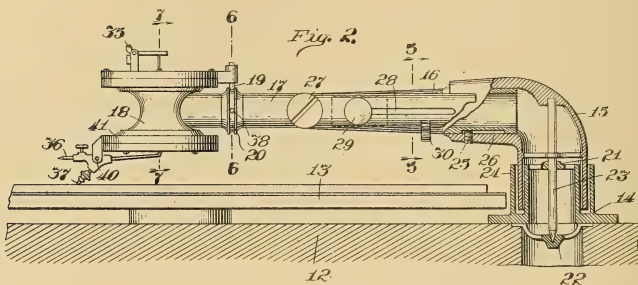


Fig. 3.

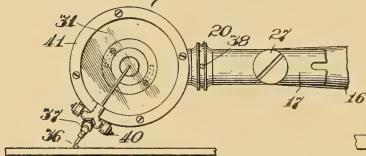
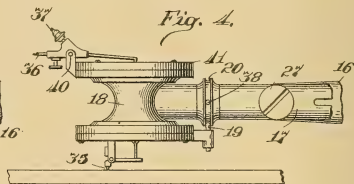


Fig. 4.



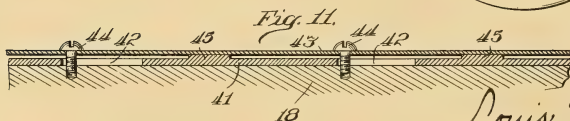
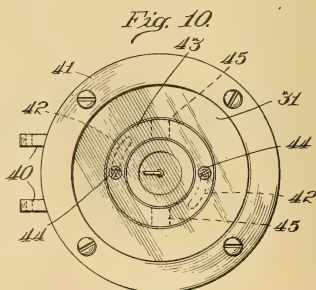
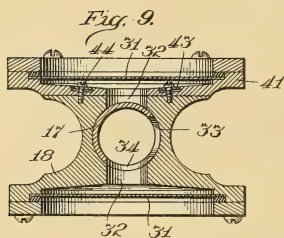
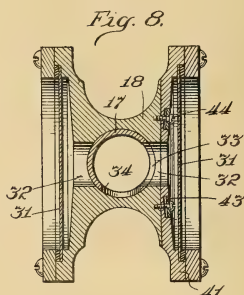
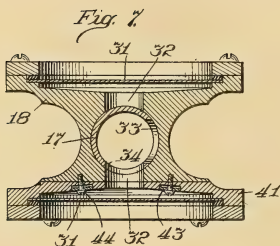
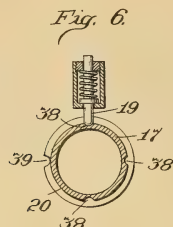
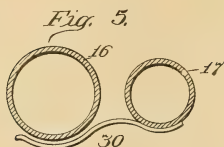
Inventor
Louis Taxon
By *Wm. V. Deln*
Attorney.

L. TAXON.
UNIVERSAL SOUND REPRODUCER AND ARM.
APPLICATION FILED FEB. 7, 1917.

1,240,267.

Patented Sept. 18, 1917.

2 SHEETS—SHEET 2.



Inventor
Louis Taxon
By *Wm. H. Bell*
Attorney.

UNITED STATES PATENT OFFICE.

LOUIS TAXON, OF ROCKFORD, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

UNIVERSAL SOUND REPRODUCER AND ARM.

1,240,267.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed February 7, 1917. Serial No. 147,254.

To all whom it may concern:

Be it known that I, LOUIS TAXON, a citizen of the United States, residing at #1823 Charles street, Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Universal Sound Reproducer and Arm, of which the following is a specification.

My invention relates to talking machines which will successfully reproduce sounds from any known disk record, and the objects of my improvements are, first, to provide an adjustable sound reproducer provided with a plurality of tracker needles or styli; second, to provide a rotating adjustment and a sliding adjustment for the sound reproducer; third, to have a sliding bar or adjustable weight in connection with the sound reproducer; fourth, to provide a liquid joint in the swinging sound arm; fifth, to make a simple, effective and durable device and other features to become apparent from the description to follow.

As is known to those versed in the art to which my invention pertains there are now several different styles of disk records made for talking machine, viz., some hill and dale cut records to be played by a sharp pointed stylus or needle; some known as the diamond disk to be played with a diamond point; other hill and dale cut records to be played by a ball pointed stylus and lateral cut records to be played by a sharp pointed needle or stylus. By the use of my invention any one of said records can be played by simply adjusting the sound reproducer to suit the particular record to be played without changing the needle or stylus. Furthermore the sound reproducer is so constructed that it is at all times free from improper vibrations by having two opposing diaphragms mounted on a solid central connecting body which forms a rigid back wall for each diaphragm, and the sound arm is provided with a liquid seal at its pivotal joint thus preventing escape of air from the column thereof within the tone arm.

To describe my invention so that others versed in the art to which it pertains can make and use the same I have illustrated it on the accompanying two sheets of drawings forming a part of this specification and in which:

Figure 1, is a plan view of a talking ma-

chine sound reproducer and arm embodying my invention; Fig. 2, is a side elevation partly in section of the same showing the ball pointed stylus in contact with the record disk; Fig. 3, is a similar view partly broken away showing the sharp pointed stylus for the lateral cut records in contact with the record disk; Fig. 4, is a similar view partly broken away showing the diamond pointed stylus in contact with the record disk; Fig. 5, is a detail sectional view enlarged taken on line 5—5 of Fig. 2 showing the construction of the sound arm; Fig. 6, is a detail sectional view on line 6—6 of Fig. 2, enlarged showing the spring lock for the sound reproducer; Fig. 7, is a sectional view taken on line 7—7 of Fig. 2, showing the position of the sound reproducer on the sound arm when the same is in position to have the ball pointed stylus or sharp pointed needle contact with the record disk; Fig. 8, is a similar view showing the position of the sound reproducer on the sound arm when the same is in a position to have the sharp pointed stylus or needle for the lateral cut record contact with the record disk; Fig. 9, is a similar view showing the position of the sound reproducer on the sound arm when the same is in a position to have the diamond pointed stylus contact with the diamond disk record; Fig. 10, is an enlarged face view of the movable diaphragm of the sound reproducer and Fig. 11 is an annular sectional view taken on line 11—11, of Fig. 10, showing the construction of the frictional ring employed on the sound reproducer.

Similar reference characters refer to similar parts throughout the several views.

The top of the cabinet is shown at 12 and the usual revolving disk plate at 13. The sound arm comprises four sections, the stationary section 14, the elbow or pivotal section 15, the sliding section 16, and the tilting section 17. The sound reproducer 18 is adjustably mounted on the forward free end of the tilting section 17, by being provided with a hole into which the tubular end of the tilting section 17 is snugly fitted. The said tubular end of section 17 is held in position with its extremity against the bottom of the hole in the sound reproducer 18 by means of a spring pressed latch 19 engaging an annular groove 20 provided on the section 17. The spring pressed latch 19 en-

gaging the annular groove 20 prevents the sound reproducer 18 being removed from section 17 except by exerting sufficient force and yet permits sound reproducer 18 to be turned on the section 17 as an axis.

The stationary part 14 of the sound arm is rigidly secured to the top 12 of the cabinet as usual and is provided with the upper bearing 21 and the lower bearing 22 in which is rotatably mounted the vertical shaft 23 rigidly secured to the elbow 15. The section 14 is provided with an annular trough 24 into which the lower tubular vertically disposed end of the elbow 15 extends. The trough 24 is partly filled with liquid, preferably oil, so that the lower end of said elbow 15 is submerged and a liquid seal is thus formed between the elbow 15 and the stationary section 14 and prevents any possible escape of air from the air column within the tone arm.

The sliding section 16 is mounted to slide in a substantially horizontal plane in the elbow 15, and has its movement in both directions limited by means of a pin or screw 25, which is secured in the elbow 15, contacting with the ends of slot 26 provided in the sliding section 16. The outer extremity of the sliding section 16 is bent in a right angle to one side and has loosely pivoted thereon at 27 the tilting section 17 to swing in a vertical plane. The sound reproducer 18 is secured on the end of the tilting section 17 forward of the pivotal point 27, and the end of the tilting section 17 to the rear of said pivot 27 is provided with a weight 28, conveniently placed inside of the tubular portion of same, which is made movable toward and away from the pivot 27 for the purpose of variably counter-weighting the sound reproducer 18. I conveniently provide a thumb screw 29 in the weight 28 extending through a slot 30 in the tilting section 17 by means of which the weight 28 is moved and secured in place.

Obviously the forward end of the tilting section carrying the sound reproducer 18 is heavier than the rear end of same and will naturally tend to swing down until contacting with some stop which when the machine is in operation is always the record disk; however, a stop is provided for said tilting section when the machine is not in operation and comprises an arm 30 secured to the section 17 and extending laterally underneath the section 16 so that the upward movement of the rear end of the tilting section 17 is limited by the free end of arm 30 contacting with the under side of section 16.

The body of the sound reproducer 18 is constructed of one piece of metal, and is of a spool-like shape having a diaphragm 31 secured on each end in the usual manner. The hole into which is fitted the tubular end of the tilting section 17 is provided in the

center connecting part of the sound reproducer 18 midway between the diaphragms 31 and the sound from the diaphragms passes through the communicating openings 32 to the central hole in which the end of the sound arm section 17 is secured. Said end of the sound arm section 17 which is within the hole in the sound box 18 is provided with two lateral openings 33 and 34. The axis of the opening 33 extends in a horizontal plane and the axis of the opening 34 extends substantially in a vertical plane.

In operative connection with the one diaphragm 31 I arrange a diamond stylus 35 to be used in connection with a diamond disk record, i. e., a record in which the sound vibrations are recorded by hill and dale cuts to be played by a diamond point.

In operative connection with the other diaphragm 31, I arrange two styli, the one having a removable sharp pointed needle to play the lateral cut records and the other having a ball pointed needle 37 to play the hill and dale cut records which can also be removed and a sharp pointed needle used. As indicated in Figs. 2, 3 and 4 and Figs. 7, 8 and 9, the sound reproducer 18 is placed in any one of three positions to play with any one of the stylus points 37, 36 or 35. In Figs. 2 and 7 the sound reproducer 18 is in a position to have the stylus point 37 contact with the record disks; in Figs. 3 and 8 the sound reproducer 18 is in a position to have the stylus needle 36 contact with the record disk, and in Figs. 4 and 9 the sound reproducer 18 is in a position to have the diamond pointed stylus 35 contact with the record disk. Thus it will be noted that the sound reproducer 18 has three operative positions about its axis each ninety degrees from the other. To retain the sound reproducer in any one of said three positions the annular groove 20 is provided with three depressions 38 spaced ninety degrees apart with which the spring pressed latch 19 operates as clearly shown in Fig. 6.

To facilitate the removal and replacing of the sound reproducer 18 from the sound arm section 17 the one wall of the groove 20 is cut away at 39 sufficiently to permit the protruding end of the latch 19 to pass out of said groove 20.

It will be noted that in Fig. 7, the position of the sound reproducer 18 is such that the hole 34 in the sound arm extension 17 registers with the hole 32 leading to the diaphragm which is being used, and the hole leading to the other diaphragm is closed, thus preventing any disturbance of said other diaphragm. Similarly when the sound reproducer 18 is in the positions shown in Figs. 8 and 9 the hole 32 leading to the unused diaphragm is sealed and also prevents any disturbance of the unused diaphragm.

It will be noted that the needles 36 and 37 are farther from the pivotal shaft 23 than is the diamond point 35, and since it is necessary to secure the best results to have the tracker styli at such distance from the said pivotal shaft 23, when in use, that the stylus will properly track in the line of indentations on the record disk it becomes necessary to slightly shorten the sound arm to use the needles 36 and 37 and lengthen the same to use the diamond point 35, and to thus vary the length of the sound arm I arrange two parts of the said arm which telescope one in the other. As clearly shown in Figs. 1 and 2, the horizontal part of the elbow 15 is bored out to have the tubular end of section 16 snugly fit the same, so it can be easily slid in and out of said elbow, i. e., toward and away from the pivotal shaft 23. As above described said sliding movement is limited by means of the set screw or pin 25.

Obviously when the diamond point 35 is to be used the section 16 is moved out away from the pivotal shaft 23, and when either the stylus 36 or the stylus 37 is to be used the section 16 is moved in toward the pivotal shaft 23.

To secure the best results from different records it requires that some styli engage the record disk with greater pressure than others, therefore when it is desired to have greater weight on the styli, the weight 28 is moved to its extreme left hand position as viewed in Figs. 1 and 2, and when less weight is desired the weight 28 is moved to its extreme right hand position.

The styli 36 and 37 are conveniently connected to the same vibrating arm which is connected to the diaphragm 31 and is mounted on a hinge at 40 secured to the end 41 of the spool-like sound reproducer 18. It will be noted that in Fig. 2, the end 41 of the sound reproducer 18 is in a position with the stylus 36 in a line parallel to the axis of the tubular tilting section 17, while in Fig. 3, said end 41 is in a position with the stylus 36 in a line at an angle of about forty five degrees to the axis of the tubular tilting section 17. It is necessary to thus shift the end 41 to have the stylus 37 properly track on the record disk and also to have the stylus 36 properly track on the record disk when respective styli are used. The end 41 carrying the diaphragm 31 and the styli 36 and 37 is therefore mounted adjustably on the sound reproducer 18 of which it forms a part. As clearly shown in Figs. 10 and 11, the end 41 is provided with a plurality of concentric arcuate slots 42 and a spring ring 43, is clamped against the flat surface of said end 41 by means of screws 44 passing through the slots 42 and secured in the body of the sound reproducer 18. The length of the slots 42 serve to limit the movement of the end 41 in both directions by the

screws 44 contacting with the ends of the slots. The ring 43 is preferably snugly fitted into a circular groove so as to serve as a guide for the turning of the end 41 from one position to the other. Slight protrusions 45 may be provided on the end 41 to contact with the underside of the spring ring 43 to insure a constant friction between the parts and to compensate for wear.

The record disks which are used in connection with the diamond pointed needle 35 are about twice as thick as the record disks which are used in connection with stylus 36 or the ball pointed stylus 37, and the stop arm 30 on the tilting section 17 are positioned so that all three styli 35, 36 and 37 can only drop a sufficient distance to transmit the vibrations from the record to the diaphragm. Thus the diamond pointed needle 35 cannot contact with either of the records used in connection with the other two styli 36 and 37, if by error a person should attempt to place the diamond pointed stylus 35 on the wrong record.

It will be understood that the material, size and arrangement of the parts may be changed without departing from the scope of my invention or sacrificing any of its material advantages.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a device of the class described, a sound arm provided with lateral perforations in its end communicating with its interior, and a sound reproducer provided with two diaphragms lying in parallel planes and with holes to register with the lateral perforations in the sound arm, said parts being so arranged that the hole communicating with the unused diaphragm will be closed and the hole communicating with the used diaphragm will register with one of the lateral perforations in the sound arm.

2. A device of the character described including a tone arm, a sound conducting tube pivotally mounted on and communicating with said tone arm, a sound box mounted on said tube, said tube having an extension on the side of its pivotal axis opposite said sound box, and a weight adjustably mounted in said tube to counterbalance the weight of said sound box.

3. A device of the character described including a tone arm, a sound conducting tube pivotally mounted on and communicating with said tone arm, a sound box mounted in said tube and selectively adjustable thereon to a plurality of positions, said tube being provided with an extension on the side of its pivotal axis opposite said sound box and a weight adjustably mounted in said tube to vary the effective weight of the sound box.

4. A device of the character described including a tone arm, a sound conducting tube

pivotally mounted on and communicating with said tone arm, a sound box adjustably mounted in said tube and having means to support a plurality of styli, each of which is
 5 operative when said sound box is adjusted to a predetermined position, said tube being provided with an extension on the side of its pivotal axis opposite said sound box and a weight adjustably mounted in said tube to vary the effective weight of the sound box.

10 5. A device of the character described including a tone arm, a sound conducting tube pivotally mounted on and communicating with said tone arm, a sound box having two
 15 diaphragms arranged in parallel planes, said sound box being selectively adjustable to a plurality of positions wherein one or the other of said diaphragms are operative, said tube having an extension on the side
 20 of its pivotal axis opposite said sound box, and a weight adjustably mounted in said tube to vary the effective weight of the sound box.

25 6. A device of the character described including a tone arm, a sound conducting tube pivotally mounted on and communicating with said tone arm, a sound box adjustably mounted on said tube and having means to support a plurality of styli, each of which
 30 is operative when said sound box is adjusted to a predetermined position, said tube having an extension on the side of its pivotal axis opposite said sound box and a weight adjustably mounted in said tube to partially
 35 and variably compensate the weight of said sound box whereby the effective pressure of said styli is varied to meet the requirements of sound records of different characters.

7. A device of the character described including a longitudinally extensible tone arm, a sound conducting tube pivotally
 40 mounted on said tone arm, a sound box adjustably mounted on said tube and having means to support a plurality of styli, each of which is operative when said sound box
 45 is adjusted to a predetermined position, said tube having an extension on the side of its pivotal axis opposite said sound box and a weight adjustably mounted in said tube to partially
 50 and variably compensate the weight of said sound box whereby the effective pressure of said styli is varied to meet the requirements of sound records of different characters.

55 8. A device of the character described in-

cluding a longitudinally extensible tone arm, a sound conducting tube pivotally mounted on said tone arm and communicating there-
 with, a sound box adjustably mounted for rotation about the longitudinal axis of said tube, said tube having an extension on the side of its pivotal axis opposite said sound box, and a weight adjustably mounted in said tube to partially and variably com-
 60 pensate the weight of said sound box.

9. A device of the character described including a longitudinally extensible tone arm, a sound conducting tube pivotally mounted on said tone arm and communicating there-
 with, a sound box adjustably mounted for rotation about the longitudinal axis of said tube, said tube having an extension on the side of its pivotal axis opposite said sound box, a weight adjustably mounted in said tube to partially and variably com-
 65 pensate the weight of said sound box, and means for locking said weight in adjusted position.

10. A device of the character described including a tone arm, a sound conducting tube
 70 pivotally mounted on and communicating with said tone arm, a sound box mounted on said tube, said tube having an extension on the side of its pivotal axis opposite said sound box, a weight within said extension, a slot in the side of said extension, and a screw extending through said slot and en-
 75 gaging said weight to lock the latter in adjusted position.

11. In a device of the class described, a 90 sound box and a stylus, a tone arm provided with a vertically disposed pivot at the rear end thereof and comprising a rear section and a forward tilting section, a horizontal pivot connecting the rear section and
 95 said tilting section, a tube extending on the opposite side of said horizontal pivot from the stylus and integral with the tilting section, said tube being provided with a longitudinal slot and a weight within said tube arranged to be shifted therein by means of a handle extending through the slot.

In testimony whereof I have signed my name to this specification in presence of two
 100 subscribing witnesses this 2d day of November, 1916, at Rockford, Illinois.

LOUIS TAXON.

Witnesses:

GUST PETERSEN,

RICHD. J. JACKER.

SOUND CONVEYOR ARM

1,240,342 ----- E. G. Hayne,
Patented - Sept. 18, 1917,
Filed - Sept. 15, 1916.

E. G. HAYNE.
SOUND CONVEYER ARM.
APPLICATION FILED SEPT. 15, 1916.

1,240,342.

Patented Sept. 18, 1917.
2 SHEETS—SHEET 1.

FIG. 1.

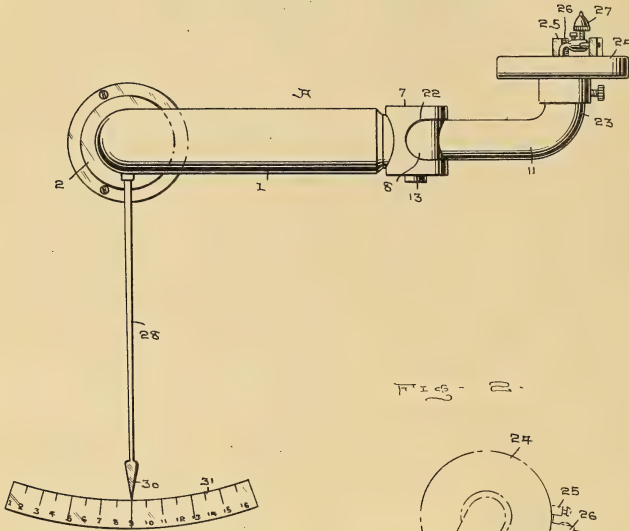
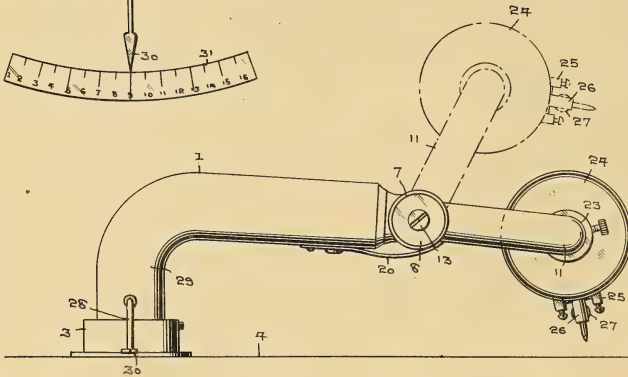


FIG. 2.



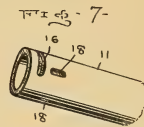
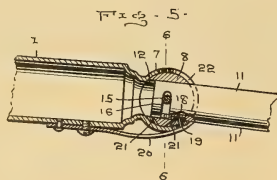
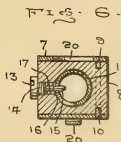
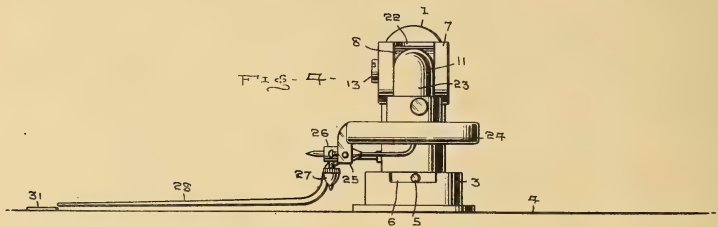
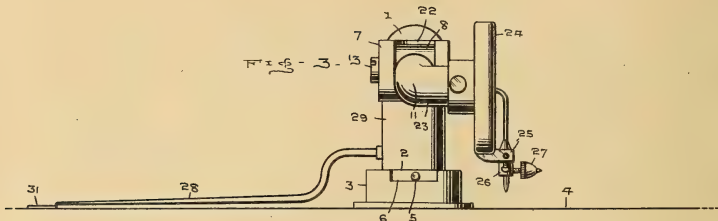
Inventor
E. G. Hayne

By W. J. Fitz Gerald & Co.
Attorneys

E. G. HAYNE.
SOUND CONVEYER ARM.
APPLICATION FILED SEPT. 15, 1916.

1,240,342.

Patented Sept. 18, 1917.
2 SHEETS—SHEET 2.



Inventor
E. G. Hayne
By W. J. Fitzgerald & Co.
Attorneys

UNITED STATES PATENT OFFICE.

EDWARD G. HAYNE, OF OTTAWA, ILLINOIS.

SOUND-CONVEYER ARM.

1,240,342.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed September 15, 1916. Serial No. 120,342.

To all whom it may concern:

Be it known that I, EDWARD G. HAYNE, a citizen of the United States, residing at Ottawa, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Sound-Conveyer Arms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the class of phonographs and more particularly to a sound conveyer arm.

The principal object of the invention is the provision of a sound conveyer arm embodying a supporting arm, an extension arm rotatably and hingedly connected to the supporting arm, and a reproducer carried by the extension arm, said extension adapted to be rotated to move the reproducer from a horizontal to a vertical position.

Another object of the invention is the provision of means for retaining the extension arm in a rotated position, whereby the reproducer will be held firmly in its respective position.

Another object of the invention is the provision of means for retaining the extension in operative or inoperative position.

A further object of the invention is the provision of spring pressed means adapted to prevent the extension arm from rotating when in an inoperative or raised position.

A still further object of the invention is the provision of an adjustable reproducer embodying means for supporting a steel needle point and means for supporting a sapphire needle point, whereby the reproducer may be adjusted to be used to play Edison and Pathe disk records or it may be adjusted to play Victor or Columbia disk records.

A still further object of the invention is the provision of an indicator arm mounted upon the rotatable sound conveyer arm and adapted to cooperate with a numbered index mounted upon the machine, said numbered index adapted to correspond with a numbered index carried by the disk record, whereby any desired part of the music that

is desired to be reproduced may be readily and quickly located.

With these and other objects in view, as will appear as the description proceeds, the invention comprises the various novel features of construction, combination and arrangement of parts, as will be more fully described hereinafter and set forth with particularity in the appended claims.

Referring to the drawings,

Figure 1 is a plan view of my improved sound conveyer arm.

Fig. 2 is a side elevation of the sound conveyer arm, showing the reproducer moved to an inoperative position by dotted lines.

Fig. 3 is an end elevation of the device, showing the reproducer disposed in a vertical position.

Fig. 4 is a similar view to Fig. 3 showing the reproducer disposed in a horizontal position.

Fig. 5 is a detail sectional view of the barrel hinge joined between the extension arm and the supporting arm.

Fig. 6 is a transverse section on the line 6-6 of Fig. 5.

Fig. 7 is a detail fragmentary perspective view of one end of the extension arm.

Similar characters of reference are used to denote like parts throughout the accompanying drawings and the annexed specification.

Referring more particularly to the drawings the letter A indicates the sound conveyer arm which is shown to consist of a horizontally rotatable supporting arm 1, one end of which is curved downwardly and provided with a bearing flange 2 that is rotatably mounted within a base 3 secured upon the top 4 of the phonograph. The flange 2 is provided with a lug 5 that moves in a slot 6 formed in the vertical wall of the base 3 and is adapted to limit the horizontal rotating movement of the supporting arm.

The forward end of the supporting arm 1 is formed with the horizontally disposed tubular barrel 7, in which is rotatably mounted a hinge pin 8 the outer ends of which are flush with the ends of the tubular

barrel 7. The hinge pin 8 is provided adjacent one end with an annular groove 9 adapted to receive a set screw 10 that extends through the barrel 7, whereby the hinge pin is held within the barrel.

5 A tubular extension arm 11 has one end rotatably mounted within a bore 12 that extends through the hinge pin 8 at a point intermediate its ends. Extending centrally through one end of the hinge pin 8 is a set screw 13, which is provided with a threaded shank 14 and a reduced extension pin 15, that extends inwardly of the hinge pin and through an arcuate slot 16 formed in the end of the extension arm 11. This arcuate slot 16 extends substantially half way around the circumference of the extension arm and is adapted to limit the rotating movement of the extension arm to a half turn. Positioned upon the reduced extension 15 between the threaded shank 14 and the end of the extension arm 11, is a coil expansion spring 17 that is adapted to exert a sufficient amount of pressure upon the end of the extension arm to prevent the latter from rotating when it is in a raised or inoperative position.

The end of the extension arm 11 is also provided with a pair of depressions 18 that are adapted to be selectively engaged by a locking pin 19 carried by the outer end of a spring arm 20, which is positioned below the tubular barrel 7 and has its terminal end secured to the bottom of the supporting arm 1. The locking pin 19 is also designed to selectively engage through recesses 21 formed in the lower portion of the hinge pin 8, to hold the hinge pin 8 at the limit of its rotation in either direction. As clearly shown in Fig. 5 of the drawings the tubular barrel 7 is provided with a circumferential slot 22 through which the end of the extension arm passes for movement therein, the opposite ends of the slot serving to limit the vertical movement of the extension arm 11. As shown the forward end of the spring arm 20 extends well under the tubular barrel 7 into engagement with the lower portion of the extension arm 11 and is adapted to form a substantial resilient support for the extension arm 11. Should the extension arm 11 accidentally fall from an inoperative to an operative position, the force of the fall of the arm would be broken by the arm coming into engagement with the outer free end of the spring arm, and this would serve as a means to prevent the records becoming broken by the needle point of the transmitter dropping suddenly thereon.

60 The outer end of the extension arm 11 is provided with a right angular extension 23 upon which is mounted a reproducer 24, which is of ordinary and well known construction, therefore it is not thought necessary to give an extended description thereof.

The reproducer carries the ordinary steel needle supporting device 25, which is shown to embody the usual form of needle socket 26. In lieu of the ordinary set screw that extends through the socket 26 to clamp the needles therein, I employ a set screw which is formed with a sapphire needle point 27 on the head thereof, whereby the sapphire needle point 27 may be used to clamp the steel needles in position when it is desired to play Victor or Columbia records, or may be used to reproduce the music from Edison or Pathé records, which latter ordinarily use a sapphire or diamond needle point with their reproducers.

In order to play or reproduce music from Victor or Columbia disk records, the extension arm carrying the reproducer is arranged in the position shown in Fig. 2 of the drawings, wherein it will be seen, and more particularly by reference to Fig. 5, that the locking pin 19 engages through one of the recesses 21 and in one of the depressions 18 of the extension arm 11, so as to hold the hinge pin 8 against rotary movement and also to prevent horizontal rotary movement of the extension arm 11. When it is desired to change the steel needle point carried by the reproducer, it is only necessary to grasp the extension arm and move the same upwardly to the position shown by dotted lines, and in so doing the hinge pin 8 will be rotated, which will cause the locking pin 19 to leave the depression 18 and ride up the inclined wall of and out of the recess 21, the locking pin 19 subsequently dropping into the other recess 21 in order to hold the extension arm 11 in its raised or inoperative position. Since the extension arm has been raised and therefore the locking pin 19 disengaged from one of the depressions 18, the expansible spring 17 carried by the set screw 13 will exert a sufficient amount of tension against the extension arm to prevent the latter from rotating, or in other words to prevent the reproducer from swinging from a vertical position to a horizontal position.

When it is desired to reproduce the music from Edison or Pathe records, where it is necessary to use a sapphire or diamond needle point, it is only necessary to grasp the reproducer and rotate the latter when in a raised or inoperative position so as to dispose it in a horizontal position, after which it may be readily and freely lowered into an operative position, as shown in Fig. 4 of the drawings, and when in such position the locking pin 19 will again engage the forward recess 21 of the hinge pin 8 and the other depression 18 of the extension arm 11 and positively and securely retain the extension arm in an operative position against movement.

From the foregoing it will be seen that by the construction described my improved 130

sound conveyer arm and reproducer carried thereby may be used to play Edison and Pathe records or Victor and Columbia disk records, without the necessity of changing any of the parts.

5 In order to indicate and locate the particular part of the music which the reproducer is reproducing, I employ an indicator arm 28 which has one end threadedly connected to the upright portion 29 of the supporting arm 1, while the other end of the indicator arm extends radially and is provided with an indicator hand 30 that is adapted to cooperate with a numbered index 31 that is carried by the phonograph machine. Each disk record is to have a numbered index to correspond to the numbered index 31 carried by the machine, and it is to be understood that this index may be printed directly upon the disk record or may be printed upon a paper sticker and attached to the record. From this it will be seen that as the needle point reduces the various parts of the music, that the indicator arm will move over the index, whereby the particular part of the music being played may be readily and quickly located at sight. Therefore, if it is desired say for instance, to reproduce the chorus the indicator arm may be moved back to the number on the index indicating the number corresponding to the number of the beginning of the chorus of the piece that may be upon the record, and in like manner any particular part of the piece may be located immediately for reproduction.

What I claim is:—

1. The combination with a phonograph, of a sound conveyer arm consisting of a tubular supporting arm, a tubular extension rotatably and hingedly connected to the supporting arm, a reproducer carried by the extension arm, yielding means to hold the extension arm in either lowered or raised position, and spring tension means to prevent the extension arm from casually rotating around its longitudinal axis.

2. The combination with a phonograph, of a sound conveyer arm comprising a supporting arm, an extension arm rotatably and hingedly connected to the supporting arm, said extension arm being rotatable around its longitudinal axis, a reproducer carried by said extension arm, yielding means to hold the extension arm in either raised or lowered position, means to prevent rotation of the extension arm around its longitudinal axis when in lowered position, and means to prevent casual rotation of the extension arm around its longitudinal axis when in raised position.

3. The combination with a phonograph, of a sound conveyer arm comprising a supporting arm, an extension arm rotatably and hingedly connected to the supporting arm,

means for holding the extension arm in operative and inoperative position, said means cooperating with the extension arm to prevent rotation of the extension arm around its longitudinal axis when the extension arm is in operative position, means for preventing the casual rotation of the extension arm around its longitudinal axis when the latter is raised to an inoperative position, and a reproducer having a pair of needles carried by said extension arm.

4. In a phonograph, the combination with a sound conveyer arm having a tubular barrel formed on the outer end thereof, a hinge pin having a bore extending entirely through the intermediate portion thereof and rotatably disposed in said barrel, said barrel being further provided with recesses in the lower portion thereof, an extension arm disposed in said hinge pin bore for rotation and provided with a circumferentially extending slot, a set screw extending centrally through one end of the hinge pin and through said slot of the extension arm and adapted to limit the rotary movement of the extension arm, said extension arm being provided with depressions adjacent the said slot thereof, and a spring arm having a locking pin adapted to selectively engage the recesses of the hinge pin and the depressions of the extension arm to hold the hinge pin and extension arm in operative position and to hold the extension arm in inoperative position.

5. In a phonograph, the combination with the sound conveyer arm thereof comprising a supporting arm having a tubular barrel formed on the free end thereof provided with a circumferential slot, a hinge pin having a bore extending therethrough rotatably mounted in the barrel, an extension arm rotatably disposed in said bore and provided with a circumferential slot adjacent its end, the said slot of the barrel adapted to limit the vertical movement of the extension arm, a set screw disposed centrally through one end of the hinge pin, said set screw being provided with a threaded shank and a reduced extension, said extension arm projecting through the circumferential slot of the extension arm and adapted to limit the rotary movement of said extension, and an expandible coil spring positioned upon the extension of the set screw between the threaded shank of the set screw and the outer surface of the extension arm and adapted to frictionally hold the extension arm against casual rotation when in an inoperative position.

6. The combination with a phonograph, of a sound conveyer arm consisting of a tubular supporting arm, a tubular extension arm rotatably and hingedly connected to the supporting arm, means to hold the extension arm in raised and lowered positions,

means to prevent rotation of the extension arm around its longitudinal axis when in a raised position, a leaf spring attached to the supporting arm and projecting under the extension arm, and means carried by the leaf spring to prevent rotation of the extension arm around its longitudinal axis when in a lowered position, said leaf spring serving in the event the extension arm should

fall from a raised position to break the force of the fall of the extension arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD G. HAYNE.

Witnesses:

FRANK F. FOLLETT,
WARREN C. RIALE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC STOP FOR PHONOGRAPH RECORDS.

1,240,401 ----- S. G. Alexander;
Patented - Sept. 18, 1917;
Filed - Jan. 15, 1917.

S. G. ALEXANDER.
 AUTOMATIC STOP FOR PHONOGRAPH RECORDS.
 APPLICATION FILED JAN. 15, 1917.

1,240,401.

Patented Sept. 18, 1917.

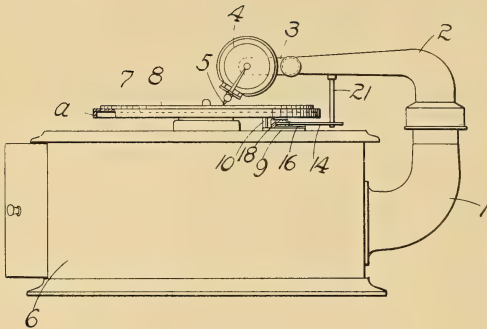


FIG. 1.

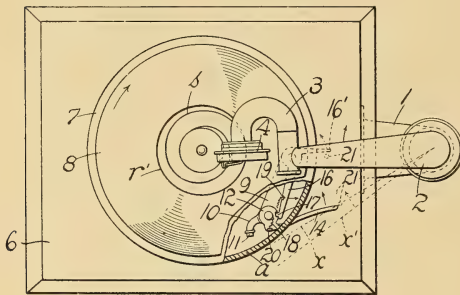


FIG. 2.

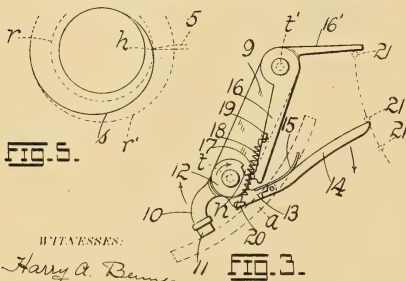


FIG. 3.

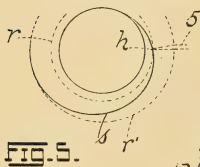


FIG. 4.

WITNESSES:
 Harry A. Benney
 Joseph A. Benney

INVENTOR:
 Sherman G. Alexander
 BY
 Oliver H. Stacey
 ATTORNEY

UNITED STATES PATENT OFFICE.

SHERMAN G. ALEXANDER, OF ST. LOUIS, MISSOURI.

AUTOMATIC STOP FOR PHONOGRAPH-RECORDS.

1,240,401.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed January 15, 1917. Serial No. 142,446.

To all whom it may concern:

Be it known that I, SHERMAN G. ALEXANDER, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Automatic Stops for Phonograph-Records, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in automatic stops for phonograph records; and it consists in the novel features of construction more fully set forth in the specification and pointed out in the claims.

The object of my invention is to provide an automatic stop for phonograph records which will arrest the rotation of all record disks when the end of the record has been reached by the stylus, irrespective of the length of the record and without regard to the radial distance of the inner terminal of the record from the rotation axis of the disk. The present stop device is thus susceptible of universal application to all records be the latter long or short, or be the same impressed on a large or small disk, the stop differing in this respect from prevailing automatic stops which must be adjusted to each individual record to make the same effective. The advantages of the present invention will be fully apparent from the following detailed description in connection with the accompanying drawings in which—

Figure 1 represents a side elevation of a disk sound reproducer showing the application of my invention thereto; Fig. 2 is a top plan thereof; Fig. 3 is an enlarged plan of the brake mechanism for the platform carrying the record disk; Fig. 4 is an edge view of the parts shown in Fig. 3; and Fig. 5 is a diagrammatic illustration of the inner circle of the record terminating close to the center of the disk in conjunction with the high pitch spiral extension of the inner circle of a record terminating at a greater distance from the center of the disk.

Referring to the drawings, 1, represents a hollow bracket arm to the upper end of which is swiveled the tone arm 2 terminating in the goose-neck or sound-box tube 3, the short arm of the goose neck leading to the reproducer 4 which supports the needle or stylus 5. The arm 1 is supported by the vertical wall of the sound chamber or box 6 above which is mounted the platform 7

carrying the record disk 8, said platform being provided with a marginal depending flange *a*, all as fully understood in the art.

Mounted pivotally about a stud *t* at one end of a supporting plate 9 on top of the box 6 below the platform 7 is a brake arm 10 terminating in a brake tip 11 of soft material such as rubber, leather and the like, said tip operating to engage the inside of the flange *a* when the brake is applied. Formed with the hub 12 of the brake is a bracket 13 to which is hinged the brake lever 14 whose short arm when the lever is in normal position or at rest is shouldered to the member 13, being held in said normal position by the flexed spring 15 bearing against the side of the lever, the fixed end of the spring being secured to the member 13. As shown to best advantage in Fig. 4, the brake 10 is offset from the hub 12 so as to bring the tip 11 in the plane of the flange *a* of the platform 7. Mounted pivotally about a stud *t'* at the opposite end of the plate 9 is a trigger lever 16 whose free end is provided with a forwardly projecting toe-piece 17 adapted to enter a notch *n* in the hub 12 of the brake arm, the said toe piece being drawn into said notch as presently to be more fully described, by the action of the contracting spring 18 one end of which is secured to a bracket or lug 19 on the lever 16 and the other end to a lug 20 on the bracket 13 leading from the hub 12.

Depending from the tone arm 2 above the box 6, is a tappet or pin 21 whose arc of oscillation lies in the path of sweep of the outer end of the brake lever 14, the function of the tappet being to actuate the members 14 and 10 in proper direction to rotate the hub 12 sufficiently to bring the notch *n* into engagement with the toe 17 as more fully explained later on. The trigger 16 is provided with a lever arm 16' disposed at an angle thereto, the member 16, 16', constituting virtually a bell-crank of which the member 16' is the shorter arm.

As well understood in the art, the records are in the form of spiral grooves starting at the outer margin of the record disk and gradually approaching the center of the disk, different records terminating at different radial distances from the centers of the disks. Some records terminate at a short radial distance from the center as for example at the outer terminal of a radius describing a small circle *r* (Fig. 5). Others

terminate at a radial distance defined by the larger circle r' (Figs. 2 and 5). It is of course desirable that the record disk be arrested in its rotation when the needle or stylus 5 reaches the circle r or r' , or the inner terminal of any record whatsoever irrespective of the radial distance of such terminal from the center of the disk. In automatic stops now generally in use, the device must be set for each record in order that the disk carrying that record may be arrested in its rotation when the needle reaches the inner terminal of the record. The object of my invention is to dispense with this individual adjustment, my improved stop being universally applicable to any record irrespective of the radius of the circle along which the inner end of the record terminates. In my invention when the stylus reaches a given point on the disk, such disk will come to a stop, it being understood however that this point corresponds in position to the outer terminal of a radius describing the smallest circle by which the inner end of the record is defined. In records which terminate outside of such innermost point, I provide a high pitch spiral groove s forming a continuation or extension of the record groove which happens to terminate along a circle of larger diameter (r') than the smallest circle (r) above referred to, the action of such spiral being fully explained in the description of the operation of the device said operation being substantially as follows: In starting a record it is of course necessary to swing the tone arm outwardly so as to bring the stylus into the outer terminal of the record groove. In Fig. 2 the center line of the tone arm for the starting position is indicated by the letter x . In starting, the lever 14 is oscillated sufficiently to bring the notch n of the hub 12 of the brake 10 opposite the toe-piece 17 whereupon the spring 18 draws the toe-piece into the notch, the parts assuming the position shown in Fig. 2. The driving mechanism in the box 6 now starts to rotate the platform 7 and disk 8 as indicated by the arrow in Fig. 2, the stylus being caused to traverse the spiral groove of the disk until the inner end of the record groove on the circle r' is reached, after which the stylus continues along the high pitch spiral groove s until it reaches the point h (Fig. 5). By this time the tappet 21 on the tone-arm will have engaged and tripped the arm 16' of the trigger 16 causing the latter to oscillate outwardly and withdraw the toe 17 out of the notch n . This leaves the hub 12 of the brake 10 free to rotate about its axis under the contracting action of the spring 18 causing the notch n to be rotated away from the toe 17 and causing the brake arm 10 with its brake tip 11 to oscillate toward and against the flange a of the platform 7 and thus arresting the said platform

and disk 8 carried thereby in their rotation. The released position of the parts controlled by the trigger 16 is shown in Fig. 3. If the inner end of the record happens to terminate on the smallest circle such as r (Fig. 5) when the stylus reaches the point h the machine will come to a stop as already described. It will be observed that the point h (Fig. 5) corresponds to a point on a disk the inner terminal of whose record is defined by the smallest circle r , said point h being at the intersection of such circle r with the spiral extension s leading from the inner terminal of a record defined by any larger circle such as r' . If the record terminates for example in the larger circle r' , the needle continues along the high pitch spiral s , and when the point h is reached, the arm 16' is tripped, the brake 10 is released and applied to the flange a of the platform 7. If on the other hand the record inserted into the machine happens to be one whose inner end terminates at a point on the smallest circle r , such a record need not be provided with a spiral s , because when the stylus reaches the point h on such smaller circle the machine will come to a stop. In other words, the spiral s is marked only on those disks whose records terminate along circles (r') which are larger than the smallest circle r at which the records of prevailing disks on the market terminate. The spiral s is inert, that is to say it is not translatable into sound as is the case of the grooves forming the record, when the stylus passes over it. It however forms an element in the stop mechanism being that it directs the stylus to the point h , this point being reached concurrently with the impact of the tappet 21 against the lever 16' when the trigger 16 is tripped to release the brake 10. In some instances and for record disks of large diameter the tone-arm 2 might have to be swung to bring its center line along the line x' (Fig. 2) that is to say past the lever 14. For this reason the said lever is hinged to the bracket 13, the weak spring 15 permitting the lever to yield to allow the tappet 21 to sweep past the lever with a return movement of the tone-arm. After the tappet has passed the lever the spring restores the latter to its normal position (Fig. 3). The device may of course be modified in many particulars without departing from the spirit of the invention; and while here shown in connection with a sound reproducer, it may with equal propriety be applied to sound recorders.

From the foregoing it will be seen that all records are caused to stop when the stylus reaches a point corresponding to the point h in records terminating in the smallest circle (r). Where they terminate on a larger circle (r') the high pitch spiral s quickly brings the needle to that point on the spiral corresponding to the point h so that all rec-

ords stop when the stylus reaches a predetermined distance from the center or rotation axis of the disk. No adjustments are necessary for individual disks.

5 Having described my invention what I claim is:

1. In combination with a rotatable record disk provided with a translatable stylus-guiding spiral record, a brake for locking the disk against rotation, a trigger for holding the brake in released position during the translation of the record, a lever hinged to yield in one direction leading from the brake and operating to throw the brake out of engagement with the disk with a movement in the opposite direction, and a movable member forming an element of the translating mechanism for tripping the trigger from engagement with the brake to permit the latter to arrest rotation of the disk when the stylus has reached the end of the record.

2. In combination with a rotatable flanged platform and record disk secured thereto, a tone-arm oscillating across the disk and carrying a stylus traversing the disk record, an oscillating brake adapted to engage the flange of the platform, a brake lever leading from said brake and hinged to yield in one direction in response to the movement of

the tone arm, a hub at the base of the brake 30 provided with a notch, an oscillating trigger provided with a toe engaging said notch during the sweep of the tone-arm with the traverse of the stylus along the record, an arm leading from the pivotal end of the 35 trigger, a contracting spring connecting the trigger and brake arm operating to rotate the hub to bring the notch out of the way of the toe and simultaneously applying the brake upon withdrawal of the toe from the 40 notch, and a tappet on the tone-arm operating to strike the lever leading from the trigger and cause the lever to trip the trigger to withdraw the toe from the notch, the parts operating substantially as and for the purpose set forth. 45

3. In a stop mechanism for record disks, an oscillating brake member, a brake lever leading therefrom and hinged to yield in one direction, and a flexed spring for restoring said lever to normal position. 50

In testimony whereof I affix my signature, in presence of two witnesses.

SHERMAN G. ALEXANDER.

Witnesses:

EMIL STAREK,
JOS. A. MICHEL.

CABINET.

1,240,402 ----- C.W. Almon;
Patented - Sept. 18, 1917;
Filed April 17, 1916.

C. W. ALMON.
CABINET.

APPLICATION FILED APR. 17, 1916.

1,240,402.

Patented Sept. 18, 1917.

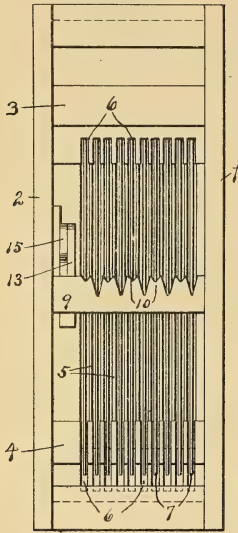


Fig. 1.

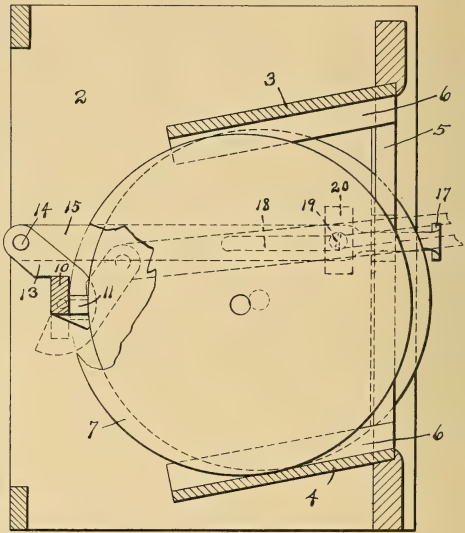


Fig. 2.

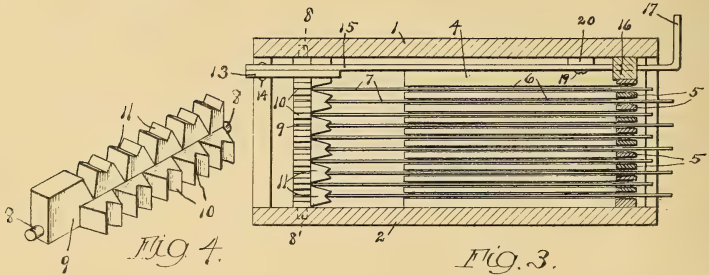


Fig. 3.

Fig. 4.

Witness
E. R. Barrett

Inventor

Charles W. Almon.

By Pagehen and Spencer

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES W. ALMON, OF YOUNGSTOWN, OHIO.

CABINET.

1,240,402.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed April 17, 1916. Serial No. 91,578.

To all whom it may concern:

Be it known that I, CHARLES W. ALMON, a citizen of the United States, and residing at Youngstown, in the county of Mahoning and State of Ohio, have invented a new and Improved Cabinet, of which the following is a specification.

This invention relates to means for storing sound records and other disks, and its object is to provide means for projecting groups of these records forwardly beyond the others so that they can be easily grasped and removed.

This invention consists of a case for holding the records vertically parallel to each other and so closely together that the removal of any desired record is difficult, and a manually operable device which projects the disks of a predetermined numerical sequence forward beyond the others so that any one of those thus projected can be easily removed from the case.

This invention further consists of the details of construction illustrated in the accompanying drawing and particularly pointed out in the claims.

In the drawing, Figure 1 is a rear view of the cabinet. Fig. 2 is a longitudinal vertical section of the cabinet. Fig. 3 is a horizontal section of the cabinet just below the upper guide. Fig. 4 is a perspective of the projecting device.

Similar reference characters refer to like parts throughout the several views.

The cabinet shown has the sides 1 and 2, the top guide 3, the bottom guide 4, and the partitions 5, whose number will depend upon the number of disks to be stored. The bottom and top guides are preferably formed to slope down toward the rear in order that the disks 7 will roll back into the cabinet and not out of it. The top and bottom guides may be formed with grooves 6 to guide the disks although both partitions and grooves may not be necessary at the same time.

Extending across the back of the disks between the sides 1 and 2 and having pintles 8 revoluble in these sides, is a bar 9 having fingers 10 and 11 in two longitudinal rows, the fingers of the two rows alternating along the bar. While the planes of the two rows are preferably at right angles to each other, this is not necessary and may be modified as desired. The fingers are spaced along the bar to correspond to the spacing

of the disks in the cabinet and the bar is preferably so placed that when a disk rests against the body of the bar, it is entirely back of the front edges of the adjacent partitions, but when the bar is so turned that when the finger immediately in the rear of the disk projects horizontally forward, the disk in contact therewith will be forced forwardly out of the case so that it can readily be grasped between the thumb and a finger.

It will be understood that each alternate disk in the cabinet (when the cabinet is full) will thus be forced forward, the other disks remaining in position. The space between these projected disks will be ample to permit any desired disk to be grasped to be removed, even when the disks are placed very close together in the cabinet, something that is very difficult, if not impossible, when all the disks are coaxial in the cabinet at all times.

To turn the bar 9 and to swing the fingers 10 and 11 up and down, a crank arm 13 may be secured to the bar 9 and be provided with a pivot 14 at its outer end. A link 15, guided at 16 at the front of the cabinet in any desired manner, connects at its rear end to this pin 14, and has its front end extending from the front of the case in the form of a handle 17. Pushing this link in and out will therefore cause alternate disks to be projected forward or be permitted to roll back into the case, the mechanism being very simple and efficient. In addition to the guide 16, the link 15 may be formed with a slot 18, through which a screw 19, carried by the block 20 on the side 2, may extend to guide the front end of the link.

The preferred form of the fingers 10 and 11 is shown in Fig. 4. The tops of these fingers are notched so as to prevent the disks from slipping sidewise, while the spaces between the fingers taper and thus insure perfect alinement of the disks at all times. Each space is in transverse alinement with the notch in the finger at right angles to the bar at that space, and the disks will at times be in both a space and a notch. Because of this alinement of notches and spaces, the rear portions of the disks will always be in alinement with the grooves 6 and all possibility of breaking the disks because of a disk slipping laterally from the end of a finger and then being engaged by the side of a finger is avoided.

Many changes may be made in the details of the cabinet and the projecting mechanism without departing from the spirit of my invention as set forth in the following claims.

5 I claim:—

1. In a cabinet for disk sound records, the combination of the exterior case and vertical partitions therein between which
10 the records may be placed on edge, a bar extending across the rear end of the case and having a series of fingers projecting at right angles therefrom, alternate fingers
15 being at substantially right angles to each other and so spaced as to engage alternate records, and means to turn the bar back and forth so that the fingers may press forward the alternate records alternately.

2. In a cabinet for disk sound records, the
20 combination of the sides, a top and a bottom guide, said top and bottom guides being formed with grooves to receive the edges of disks, a bar extending across the cabinet
25 at the rear of said records and having two longitudinal rows of projections, the projections of one row being spaced to engage alternate records while the projections of
30 the other row are spaced to engage the remainder of the records, and means to turn said bar back and forth to project alternate records forwardly.

3. In a cabinet for disks, the combination
35 of the sides, a top and a bottom guide, the bottom guide sloping down rearwardly to cause the disks to roll back into the case, and a bar revolvably mounted in the case at the rear of the disks and provided with

rows of projections so spaced that the turning of the bar will project the disks forwardly from the case in predetermined
40 groups.

4. In a cabinet for disks, the combination of the sides, a top and a bottom guide, the bottom guide sloping down rearwardly to cause the disks to roll back into the case,
45 a bar revolvably mounted in the case at the rear of the disks and provided with rows of projections so spaced that the turning of the bar will project the disks forwardly from the case in predetermined groups, a
50 crank connected to said bar, and a link extending from said crank out of the front of the cabinet and movable longitudinally back and forth to rock said bar and the projections thereon.
55

5. In a cabinet for disks, the combination of a case formed with vertical partitions between which the disks may be inserted and a movable member at the rear end of the cabinet for projecting the disks forwardly in predetermined groups.
60

6. A cabinet for disks provided with a bottom on which the disks are supported on edge and which slopes down rearwardly to cause the disks to roll back into the case,
65 and a projecting member pivotally mounted in the case back of the disks and provided with rows of projecting fingers so spaced that each disk will be engaged by a finger when the projecting member is turned, said
70 fingers having notches in their outer ends and the spaces between adjacent fingers in the same row tapering inwardly.

CHARLES W. ALMON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MOTOR CONTROLLING MECHANISM FOR TALKING MACHINES.

1,240,455 ----- A. A. Huseby.
Patented - Sept. 18, 1917;
Filed - Apr. 6, 1917.

MOTOR CONTROLLING MECHANISM FOR TALKING MACHINES.

1,240,455.

Patented Sept. 18, 1917.

2 SHEETS—SHEET 1.



Witnesses:
Jas C. L. Swin
C. H. Rosner.

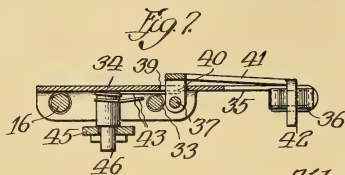
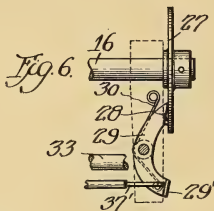
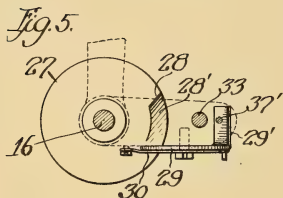
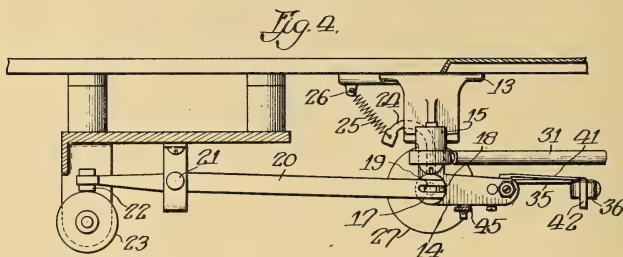
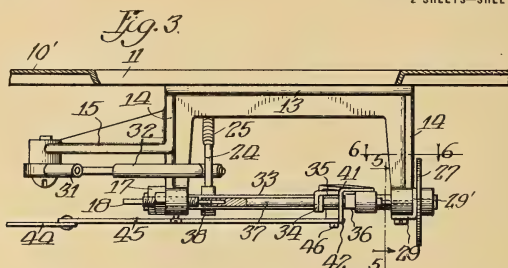
Indebitor:
Albert A. Huseby.
By Bond & Wife. Allgys.

A. A. HUSEBY.
MOTOR CONTROLLING MECHANISM FOR TALKING MACHINES.
APPLICATION FILED APR. 6, 1917.

1,240,455.

Patented Sept. 18, 1917.

2 SHEETS—SHEET 2.



Witnesses:

Ed. C. Brown
C. L. Rossner.

Inventor:
Albert A. Huseby.
By: Ford & Wilson
Attys.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

MOTOR-CONTROLLING MECHANISM FOR TALKING-MACHINES.

1,240,455.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed April 6, 1917. Serial No. 160,150.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Motor-Controlling Mechanisms for Talking-Machines, of which the following is a specification.

This invention relates to motor-controlling mechanisms more especially designed for talking machines, and has reference more particularly to automatic devices for effecting the application and release of the brake through the agency of a movable element of the machine,—usually the swinging tone-arm. Recent developments in this art have produced a number of devices wherein a spring-actuated brake is normally held retracted by a latch mechanism, and this latter is unlatched by a latch-tripping mechanism located in the path of movement of the tone-arm and engaged by the latter at the limit of its inward movement in playing a record. Some of these devices are also provided with a brake-retracting and latch resetting device that is struck by the tone-arm when the latter is returned to its starting position.

My present improvements relate to automatic stopping and starting devices of this general character, and the general purpose and aim of the invention is to produce an automatic motor-controlling mechanism that shall be simple and economical to manufacture, easy to manipulate, and efficient, sensitive and reliable in operation. This and other objects and advantages of the invention will be apparent to those skilled in the art from a consideration of the following detailed description, taken in connection with the accompanying drawings, which show a practical and approved embodiment of the invention, and in which—

Figure 1 is a bottom plan view of the mechanism shown as applied to the underside of the usual metal plate in which the turntable is mounted and from which the motor and its adjuncts are suspended;

Fig. 2 is a top plan view of the mechanism shown in Fig. 1 turned end for end and with the attaching plate of the frame structure cut off to disclose underlying parts;

Fig. 3 is a side elevation as viewed from the right of Fig. 1 inverted;

Fig. 4 is an end elevation as seen from the left of Fig. 3;

Figs. 5 and 6 are enlarged detail sections on the corresponding lines of Fig. 3, the stationary frame parts appearing in dotted lines for the sake of clearness;

Fig. 7 is an enlarged vertical section on the line 7—7 of Fig. 2.

Referring to the drawings, 10 designates the usual metal plate of a cabinet talking machine in which the turntable is mounted and to the underside of which the motor and its associated parts are secured. As here shown said plate has a rear extension 10' in which is formed an elongated opening 11 that accommodates the swinging movement of the upright portion of the tone-arm indicated in Fig. 1 at 12.

To the under side of the plate 10 is secured a frame structure which supports the several elements of the mechanism, said frame structure comprising an attaching plate 13, a pair of parallel depending L-shaped arms 14, and a bracket arm 15 extending horizontally from one of the arms 14. In and between the arms 14, at the elbows thereof is journaled a rock shaft 16, on one overhanging end of which is a disk 17 (Fig. 4) carrying an eccentric pin 18 that is engaged by the slotted end 19 of a brake-lever 20, said brake-lever being fulcrumed at 21 and carrying at its other end a brake-block 22 that coöperates with the periphery of a brake-disk 23 on the governor shaft of the motor. Fast on the rock shaft 16 is an arm 24 to the free end of which is connected a tensile spring 25 anchored at 26, said spring, through the described connections, normally tending to apply the brake-block 22 to the disk 23.

Keyed to the other overhanging end of the rock shaft 16 is a ratchet disk 27, on the inner face of which is formed a single tooth or shoulder 28 (Figs. 5 and 6). Pivoted on the lower side of the horizontal limb of one of the side frame members 14 is a detent pawl 29, the nose of which is constantly urged against the inner face of the ratchet disk 27 by a spring 30. By reference to Fig. 5 it will be seen that the tooth 28 has a long gradually inclined side 28', over which the nose of the pawl wipes as the disk is turned in a clockwise direction, viewing Fig. 5, by the brake-retracting mechanism next to be described, until the nose of the pawl snaps over the square end or shoulder 28, thus locking the disk against turning in the reverse direction under the

pull of spring 25 until the pawl has been retracted.

On the outer end of bracket arm 15 is pivoted at its elbow a bell-crank lever, one arm 31 of which extends across the path of travel of the tone arm 12, as shown in Fig. 1, and the other arm 32 of which has a bent end engaging behind the arm 24 of the rock shaft, as best shown in Fig. 3. From this it will be seen that as the tone-arm is swung outwardly of the record to starting position, it strikes the arm 31 of the bell-crank lever and rocks the shaft 16, against the pull of spring 25, withdrawing the brake 22 and at the same time carrying the ratchet tooth 28 into locking engagement with the detent pawl 29. This position of the parts is maintained during the playing of the record; and when the tone-arm reaches the end of the record it strikes a pawl-tripping device next to be described, by which the pawl 29 is retracted and the spring 25 allowed to set the brake.

33 designates a rod extending between the horizontal limbs of the side frame members 14, and forming with the rock shaft 16 a slideway upon which is mounted a slide 34. From one end of this slide extends a buffer arm 35 carrying at its free end a buffer block 36 of felt or like material. 37 designates a push-rod disposed parallel with the rod 33, and having a reduced end 37' which is slidably mounted in one of the arms 14, this reduced end being adapted to strike an upstanding tail-piece 29' of the pawl 29, as best shown in Figs. 5 and 6, to withdraw the pawl from the ratchet. The other end of the push-rod is made tubular for a short distance so as to slidably engage an adjustable mandrel 38 (Fig. 3) carried by the other arm 14. The slide 34 extends over the push-rod 37, as shown in Fig. 7, but has no engagement therewith, and is formed with a slot 39 through which project a pair of spaced hinge-lugs or ears 40 on the inner end of a trip-arm 41, said lugs being slidable along the push rod when pushed by the slide 34. The trip arm 41 has a downwardly bent free end 42 that lies in front of the buffer block 36. A light spring 43 (Figs. 1 and 7) acts on the hinge-lugs of the trip arm in such a manner as to normally maintain the depending end 42 of the trip arm spaced slightly away from the buffer block 36.

The slide 34 is set to the desired position on the slideway by a manually operated lever 44 (Fig. 1) and a link connection 45 therefrom to a stud on the lower side of the slide 34. This manually operated slide setting mechanism is identical with that shown and described in my former Patent No. 1,224,547, dated May 1, 1917, to which reference may be had for a full disclosure.

In the operation, the tone arm is set with

the needle or stylus at the inner end of the record groove. The slide 34 is then manually moved inward until the free end 42 of the trip arm and the buffer block 36 strike the tone arm. The tone arm is then swung outwardly, retracting the brake and setting the detent mechanism, as already described. As the tone arm moves away from the buffer block, the spring 43 acts to set the free end 42 of the trip arm slightly away from the buffer block. When now the tone arm, at the completion of the playing of the record, strikes the end 42 of the trip arm the hinge lugs or ears 40 of the latter bite on and actuate the push rod, thus releasing the detent mechanism and allowing the spring 25 to set the brake and stop the motor.

Without limiting myself to the specific details shown and described,—

I claim:

1. In a motor-controlling mechanism for talking machines, the combination of a brake, brake applying and releasing mechanism including a rock shaft and a spring tending to apply said brake through said shaft, a ratchet disk connected to said shaft, a detent pawl, a spring urging said pawl into engagement with said disk, a push-rod for disengaging said pawl from said disk, and a push-rod actuating member located in the path of a movable element of the machine.

2. In a motor-controlling mechanism for talking machines, the combination of a brake, brake-applying and releasing mechanism including a rock shaft and a spring tending to apply said brake through said shaft, a ratchet disk connected to said shaft, a detent pawl, a spring urging said pawl into engagement with said disk, a push-rod for disengaging said pawl from said disk, a push-rod actuating member operated by a movable element of the machine when moving in one direction, and a brake-retracting member actuated by said movable element when moving in the opposite direction.

3. In a motor-controlling mechanism for talking machines, the combination of a brake, brake-applying and releasing mechanism including a rock shaft and a spring tending to apply said brake through said shaft, a ratchet disk connected to said shaft, a detent pawl, a spring urging said pawl into engagement with said disk, a push-rod for disengaging said pawl from said disk, and a trip-arm slidably mounted at one end on said push-rod so as to be adjustable lengthwise of the latter and having its free end disposed in the path of a movable element of the machine.

4. In a motor-controlling mechanism for talking machines, the combination of a brake, brake applying and releasing mechanism including a rock shaft and a spring tending to apply said brake through said

shaft, a ratchet-disk connected to said shaft, a detent pawl, a spring urging said pawl into engagement with said disk, a push-rod for disengaging said pawl from said disk, 5 a trip-arm slidably mounted at one end on said push-rod so as to be adjustable lengthwise of the latter and at its free end adapted to be contacted by a movable element of the machine when moving in one direction, 10 an arm on said rock shaft to which one end of said brake-applying spring is connected, and a bell-crank lever having one arm thereof engaging said rock shaft arm and its other arm adapted to be contacted by 15 said movable element when moving in the opposite direction.

5. In a motor-controlling mechanism for talking machines, the combination of a frame structure, a rock shaft journaled in said frame structure, a brake lever at one end connected to and actuated by said rock shaft and carrying a brake-block at its other end, an arm on said shaft, a spring connected to said arm and tending to ap- 20 ply said brake-block, a ratchet disk fast on said shaft, a detent pawl, a spring urging said pawl into engagement with said disk, a push-rod supported by said frame structure parallel with said shaft for disengag- 30 ing said pawl from said disk, and a trip-arm slidably mounted at one end on said push-rod so as to be adjustable lengthwise of the latter and having its free end disposed in the path of a movable element of 35 the machine.

6. In a motor-controlling mechanism for talking machines, the combination of a frame structure having parallel side mem- 40 bers, a rock shaft journaled in and between said side members, a brake-lever at one end connected to and actuated by said rock shaft and carrying a brake-block at its other end, a spring tending to apply said brake-block, a ratchet disk fast on said shaft, a detent 45 pawl, a spring urging said pawl into en-

gagement with said disk, a rod connecting said side frame members parallel with said shaft and forming with the latter a slide- 50 way, a slide on said slideway having a projecting buffer arm, a buffer-block carried by the free end of said buffer-arm, a push-rod supported by and between said side frame members parallel with said slideway, 55 and a trip-arm slidably mounted at one end on said push-rod and actuated lengthwise of the latter by said slide, said trip-arm resting upon said buffer arm and having a down turned free end lying slightly in advance of said buffer-block.

7. In a motor-controlling mechanism for 60 talking machines, the combination of a frame structure having parallel side mem- bers, a rock shaft journaled in and between said side members, a brake lever at one end connected to and actuated by said rock shaft 65 and carrying a brake-block at its other end, a spring tending to apply said brake-block, a ratchet disk fast on said shaft, a detent pawl pivoted on one of said side frame members, a spring urging said pawl into en- 70 gagement with said disk, a rod connecting said side frame members parallel with said shaft and forming with the latter a slide- way, a slide on said slideway having a rigid projecting buffer arm, a buffer-block car- 75 ried by the free end of said buffer arm, a push-rod supported by and between said side frame members parallel with said slide- way, a trip-arm formed at one end with a pair of separated down turned lugs slid- 80 ably mounted on said push-rod and actuated lengthwise of the latter by said slide, said trip-arm resting upon said buffer arm and having a down turned end lying along- 85 side said buffer-block, and a spring engag- ing said trip-arm in a manner to maintain its free end normally slightly spaced from said buffer-block.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE.

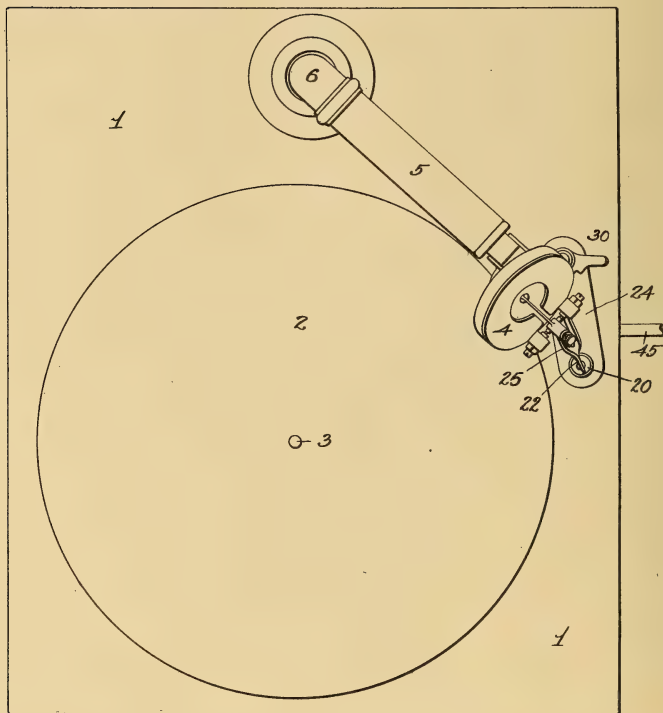
1,240,497 ----- Sheble & Kraemer.
Patented - Sept. 18, 1917;
Filed - Apr. 9, 1917.

H. SHEBLE & T. KRAEMER.
TALKING MACHINE.
APPLICATION FILED APR. 9, 1917.

1,240,497.

Patented Sept. 18, 1917.
3 SHEETS—SHEET 1.

Fig. 1.



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TALKING MACHINE.
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1,240,497.

Patented Sept. 18, 1917.
3 SHEETS—SHEET 2.

Fig. 2.

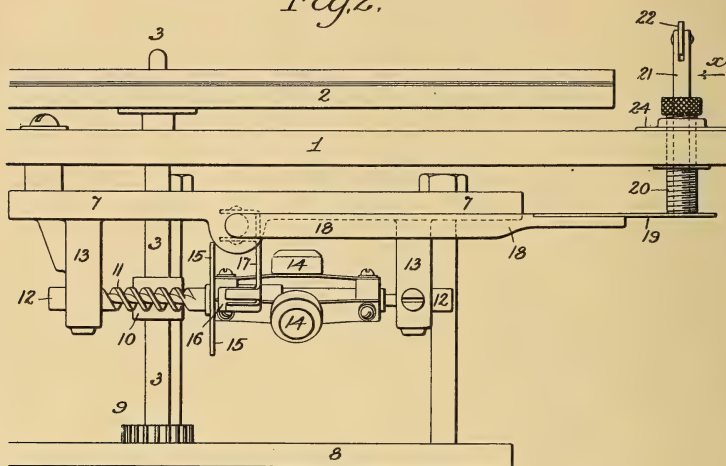


Fig. 3.

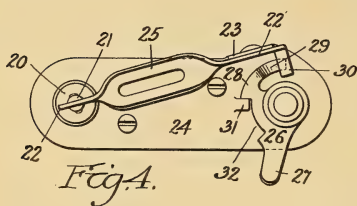
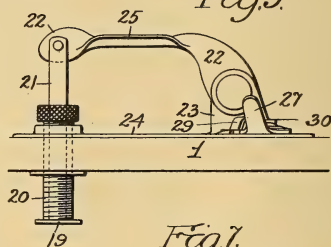


Fig. 4.

Fig. 7.

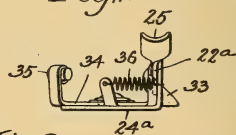


Fig. 8.

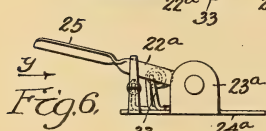
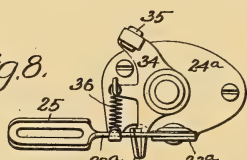
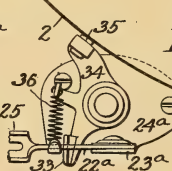


Fig. 6.

Fig. 9.



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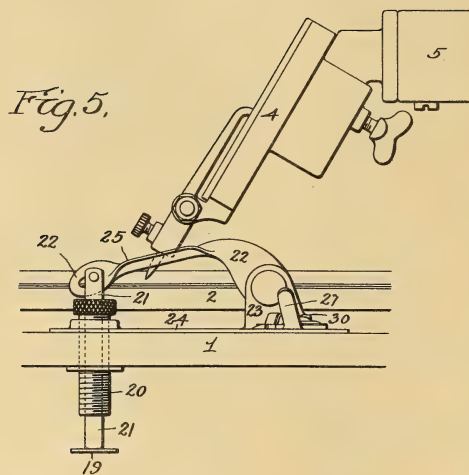
TALKING MACHINE.

APPLICATION FILED APR. 9, 1917.

1,240,497.

Patented Sept. 18, 1917.

3 SHEETS—SHEET 3.



INVENTORS
HORACE SHEBLE & THOMAS KRAEMER
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UNITED STATES PATENT OFFICE.

HORACE SHEBLE AND THOMAS KRAEMER, OF PHILADELPHIA, PENNSYLVANIA,
ASSIGNORS TO DOMESTIC TALKING MACHINE CORPORATION, OF PHILADELPHIA,
PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

TALKING-MACHINE.

1,240,497.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed April 9, 1917. Serial No. 160,759.

To all whom it may concern:

Be it known that we, HORACE SHEBLE and THOMAS KRAEMER, citizens of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Talking-Machines, of which the following is a specification.

Our invention consists of certain improvements in talking machines, referring especially to the brake mechanism and motor construction thereof, the object of our invention being to provide brake mechanism which, while it may be operated manually, is primarily intended to be controlled by the weight of the sound box or of the sound box and tone arm when said sound box is not in playing position.

This object we accomplish in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a talking machine showing the casing, the record-carrying turntable, the tone arm, and sound box, and such portion of the brake-operating mechanism as appears upon the outside of the casing;

Fig. 2 is a side elevation showing certain of the turntable rotating devices, and the way in which the brake acts thereon;

Fig. 3 is a side elevation of the brake-operating mechanism looking in the direction of the arrow *x*, Fig. 2;

Fig. 4 is a plan view of the mechanism shown in Fig. 3;

Fig. 5 is a view similar to Fig. 3, but showing the manner in which the sound box coöperates with the brake-operating mechanism in order to cause the brake to act;

Fig. 6 is a side elevation of a modified form of brake with its operating mechanism;

Fig. 7 is an end view of the same looking in the direction of the arrow *y*, Fig. 6;

Fig. 8 is a plan view of the same with the parts in the positions assumed by them when the turntable is rotating, and

Fig. 9 is a similar view showing the parts in the positions assumed by them when the brake is applied to stop rotation of the turntable.

Referring in the first instance to Fig. 1, the talking machine casing 1 is shown, together with the turntable 2, turntable-operating shaft 3, sound box 4, and tone arm 5. The sound box is shown as being rigidly

attached to the tone arm in which case the tone arm will be pivoted at its inner end 6 in such a manner as to be both laterally and vertically movable and, in the case of a construction of this kind, our improved brake mechanism is designed to be actuated by the combined weights of the sound box and the tone arm. In cases where the tone arm is capable only of lateral movement the sound box will be vertically movable with respect thereto, and in such case our brake mechanism will be actuated by the weight of the sound box alone.

In Figs. 2 to 5 we have illustrated the preferred form of brake operating mechanism and have shown how the brake operates to permit or prevent the rotation of the turntable 2. Referring to Fig. 2, in which, for purposes of clarity, no attempt has been made to illustrate the turntable rotating motor, the turntable shaft 3 is shown as adapted to bearings in upper and lower frames 7 and 8, and projecting through the upper frame 7, through the top casing 1 and carrying the turntable 2 at its upper end.

The shaft 3 is provided at its lower end with a spur wheel 9 through the medium of which rotation is imparted to the shaft from the motor. The shaft is further provided between the frames 7 and 8 with a worm wheel 10 which meshes with a worm formed on a governor shaft 12 adapted to bearings 13 depending from the upper frame 7. One end of the governor, which is equipped with the usual weights 14, is fastened to the shaft 12 and the other end is free to slide thereon and carries a brake disk 15.

Coöperating with the brake disk 15 is a brake pad 16 carried by one arm 17 of a bell crank lever mounted in bearings on the upper frame 7. The other arm 18 of this bell crank lever is provided at its outer end with a spring finger 19 which bears against the lower face of an adjusting screw 20 which passes through the casing 1. By means of this adjusting screw 20 the speed of rotation of the turntable is regulated, as the vertical adjustment of the screw causes the brake pad 16 to be positioned closer to or farther from the brake disk 15 of the governor.

Passing vertically through the screw 20, being guided thereby and free to slide there-

through, is a rod 21 the lower end of which also bears against the spring finger 19, the upper end being pivotally connected to the outer end of a lever 22 which is pivotally mounted upon a stud 23 upstanding from a plate 24 fastened to the outer face of the casing 1. This lever 22 is provided with a pocket 25 for the reception of the sound box 4 when the same is not in playing position.

When the sound box is in playing position the parts occupy the position shown in Figs. 2 and 3, and the brake pad 16 is moved away from the brake disk 15, permitting the latter to revolve. When, however, the sound box is removed from playing position and dropped into the pocket 25 formed in the lever 22 the weight of the sound box causes the brake actuating parts to assume the position shown in Fig. 5, the rod 21 being pushed down through the speed regulating screw 20, pushing down the spring finger 19 and arm 18 of the bell crank lever and so swinging the arm 17 of the bell crank lever as to bring the brake pad 16 into contact with the brake disk 15 of the governor and prevent further rotation of the same, thereby stopping the rotation of the turntable. The spring finger 19 at the outer end of the arm 18 of the bell crank lever serves as a shock absorber in case the sound box is accidentally or carelessly dropped too heavily into the pocket 25 on the lever 22, and prevents the jar being passed on to the governor mechanism.

If it is not desired to employ the weight of the sound box to operate the brake the operation may be independently accomplished manually by means of a rotatable lever 26 pivotally mounted upon the plate 24 (Fig. 4). One arm 27 of the lever 26 is adapted to be grasped by the fingers and the other arm 28 is provided with a cam 29 which coöperates with a tail 30 on the lever 22 so that said lever 22 may be moved from the position shown in Fig. 3 to that shown in Fig. 5, or vice versa, by means of partial rotation of the lever 26, the movement of which is limited by a lug 31 struck up from the plate 24 and in engagement with a notch 32 in the edge of the lever 26.

In Figs. 6 to 9 we have illustrated a modified form of brake which operates against the edge of the turntable so as to frictionally prevent rotation thereof. In this device a lever 22^a provided with the sound box receiving pocket 25 is pivoted to a lug 23^a upstanding from a plate 24^a and has its lower edge in engagement with a cam face 33 formed on one arm of a lever 34 pivoted to the plate 24^a. The other arm of the lever 34 carries a brake pad 35 which is adapted to engage directly the edge of the turntable 2. The lever 34 is normally held by means

of a spring 36 so that the brake pad 35 is free from contact with the edge of the turntable but when the lever 22^a is acted upon by the weight of the sound box it is pushed down and the action of its lower edge upon the cam face 33 serves to swing the lever 34 about its pivot so as to bring the brake pad 35 into contact with the edge of the turntable 2, thereby preventing further rotation of the same.

We claim:

1. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a reproducing device, and means controlled by the weight of said reproducing device and coöperating with said governor whereby the operation of said motor may be permitted or stopped.

2. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a reproducing device, and means controlled by the weight of said reproducing device and coöperating with said governor whereby the operation of said motor may be permitted or stopped, said means being also operable manually.

3. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a reproducing device, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, and means controlled by the weight of the reproducing device and acting upon the other arm of said lever whereby said brake pad is so moved with reference to the governor brake disk as to permit or stop the operation of the motor.

4. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a reproducing device, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, and means controlled by the weight of the reproducing device and acting upon the other arm of said lever whereby said brake pad is so moved with reference to the governor brake disk as to permit or stop the operation of the motor, said means being also operable manually.

5. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a reproducing device, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, a speed regulating device acting upon the other arm of said lever, and means passing

through said speed regulating device and acting upon the same arm of the lever, said means being controlled by the weight of said reproducing device for causing said lever to move independently of said speed regulating device so as to so move said brake pad with reference to the governor brake disk as to permit or stop the operation of the motor.

6. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a reproducing device, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, a speed regulating device acting upon the other arm of said lever, and means passing through said speed regulating device and acting upon the same arm of the lever, said means being controlled by the weight of said reproducing device for causing said lever to move independently of said speed regulating device so as to so move said brake pad with reference to the governor brake disk as to permit or stop the operation of the motor, said means being also operable manually.

7. The combination, in a talking machine of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, a yielding member mounted on the other arm of said lever, and means acting upon said yielding member to cause said bell crank lever to move so as to so move said brake pad with reference to the governor brake disk as to permit or stop the operation of the motor, said yielding

member acting as a shock absorber to prevent any jar being transmitted therebeyond.

8. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, a yielding member mounted on the other arm of said lever, and means controlled by the weight of the reproducing device and acting upon said yielding member to cause said bell crank lever to move so as to so move said brake pad with reference to the governor brake disk as to permit or stop the operation of the motor, said yielding member acting as a shock absorber to prevent any jar being transmitted therebeyond.

9. The combination, in a talking machine, of a record-carrying turntable, a motor for rotating the same, a governor for controlling the speed of said motor, a bell crank lever, a brake pad carried by one arm of said lever and coöperating with the brake disk of the governor, a yielding member mounted on the other arm of said lever, and means controlled by the weight of the reproducing device and acting upon said yielding member to cause said bell crank lever to move so as to so move said brake pad with reference to the governor brake disk as to permit or stop the operation of the motor, said means being also operable manually, said yielding member acting as a shock absorber to prevent any jar being transmitted therebeyond.

In testimony whereof, we have signed our names to this specification.

HORACE SHEBLE.
THOMAS KRAEMER.

PHONOGRAPHIC REPRODUCER

1,240,504 ----- E. G. Smith,
Patented - Sept. 18, 1917,
Filed - Aug. 30, 1915.

E. G. SMITH,
 PHONOGRAPHIC REPRODUCER.
 APPLICATION FILED AUG. 30, 1915.

1,240,504.

Patented Sept. 18, 1917.

FIG. 1.

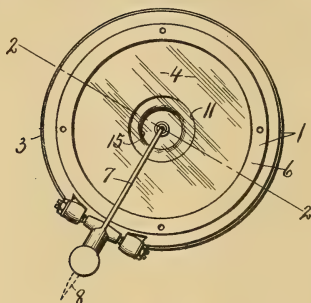


FIG. 2.

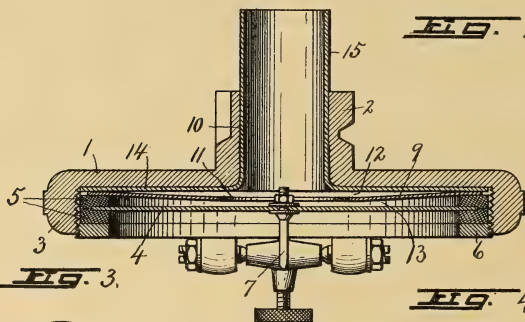


FIG. 3.

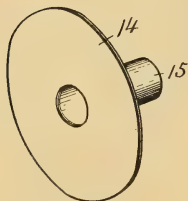
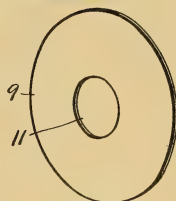


FIG. 4.



WITNESSES:
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H. E. Chase

INVENTOR
E. G. Smith
 BY *Howard P. Benson*
 ATTORNEY.

UNITED STATES PATENT OFFICE.

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PHONOGRAPHIC REPRODUCER.

1,240,504.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed August 30, 1915. Serial No. 47,090.

To all whom it may concern:

Be it known that I, EDWARD G. SMITH, a citizen of the United States of America, and resident of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Phonographic Reproducers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in phonographic reproducers, involving the use of a suitable case having a sound-wave exit for connection with an amplifier, in combination with a diaphragm supported at its marginal edges within the case across the exit and a vibrator connected to the diaphragm and provided with a stylus for contact with the sound-producing record.

It is well known that in instruments of this character the reproduction of sounds, and particularly the more refined or classic musical renditions, both vocal and instrumental, is accompanied by more or less discordant or interferent tones which is believed to be caused by sympathetic vibrations of the confining mediums for the diaphragm and air columns of said reproducer.

This theory so far as it relates to the production of interferent vibrations is probably correct, but so far as I am aware does not deal with the quality of those vibrations or the manner in which they affect the rhythmic motion of the sound-waves as produced by the vibration of the diaphragm.

In extending my investigations along this line, I find that the diaphragm case usually employed is constructed of highly vibratory metal, such as steel or equivalent material, which, owing to its excess magnitude and rigidity as compared with the size and rigidity of the diaphragm, must necessarily produce sympathetic vibrations of proportionately higher frequencies, thus producing a corresponding agitation of the air in and around the rhythmic vibrations produced by the diaphragm, and causing the accompanying shrill tones commonly observed in instruments of this character.

My investigation shows that these interferent high frequency vibrations are produced more pronouncedly by the back of the diaphragm case between the hub and rim which incidentally creates a corresponding agitation of the intervening air column between the back of the case and diaphragm,

and causes vibrations of similar frequency to be set up in the more rigid parts of the diaphragm nearest its point of securement around its marginal edges which would tend to produce nodal points in the diaphragm whereby different parts thereof would be vibrated at different frequencies, the central portion tending to vibrate rhythmically in accordance with the sound-waves of the record as produced by the contact of the stylus therewith, while the portions near the marginal edges of the diaphragm apparently vibrate at a much higher frequency.

The main object, therefore, of my present invention is to reduce to a minimum the production or transmission of interferent vibrations from the diaphragm case to the diaphragm, or from said case to the exit for the sound-waves produced by the diaphragm.

In other words, I have sought to provide economical means capable of being placed in any of the standard forms of reproducers for eliminating or deadening the shrillness or discordant tones commonly present in instruments of this character.

Other objects and uses relating to specific parts of the device will be brought out in the following description.

In the drawings—

Figure 1 is a front face view of a phonographic reproducer embodying my invention.

Fig. 2 is an enlarged sectional view of the same device, taken on line 2—2, Fig. 1.

Figs. 3 and 4 are perspective views of the detached inner and outer disks upon which my invention is based.

In order that my invention may be clearly understood, I have shown an ordinary Columbia reproducer comprising a case—1—having a hollow hub—2—and a rim—3—for receiving a diaphragm—4—which is held in place around its marginal edges by cushion rings—5—and a screw ring—6—, the diaphragm—4—having the central portion attached in the usual manner to one end of the lever—7—, the other end of which is adapted to carry the stylus—8—, shown by dotted lines in Fig. 1.

One of the features of my invention consists in providing a circular concavo-convex disk—9— of substantially the same diameter as the diaphragm—4— and having its marginal edges clamped between the inner ring—5— and back of the case—1— so

that its remaining portions may be interposed between the diaphragm and back of the case in spaced relation thereto with the convex side facing the diaphragm, and therefore, the concave side facing the usual sound-wave exit —10— centrally in the back of the case.

This disk —9— is provided with a central opening —11— co-axial with, but slightly larger than the exit —10—, so as to allow free passage of the sound-waves produced by the vibration of the diaphragm.

By locating the disk —9— in the manner described, it divides the chamber between the diaphragm and back of the case into relatively shallow compartments —12— and —13—. This disk —9— is more nearly the thickness of the diaphragm than the back of the case, and while it acts as a baffle to prevent the transmission of the high frequency vibrations from the case —1— to the diaphragm, it is preferably made of thin copper, lead or equivalent material which is incapable of rhythmic vibrations, particularly of high frequency and, therefore, tends to negative any high frequency agitation of the air which might be produced by the sympathetic vibration of the case —1— as the diaphragm is vibrated in the usual manner for reproducing sounds.

For a similar reason, I have provided the inner face of the case —1— with a flat lining disk —14— of the same material having a tubular hub —15— extending through and fitting closely within the hub —2— of the case for the purpose of additionally neutralizing or deadening any sound-wave effects which may be produced by the vibration of the adjacent portions of the case —1—.

The amplitude of the central portion of the diaphragm —4— is of course greatest, and by making the central opening —11— in the disk —9— relatively large as compared with the exit opening in the case, allows both disks —9— and —14— to be used in the standard forms of reproducers without any change or reconstruction of the parts thereof, the marginal edges of both disks being clamped in place by the same means which holds the diaphragm.

Another object in making the opening —11— in the disk —9— relatively larger than the exit opening in the case is to permit greater freedom of movement of the sound-waves to the exit as produced by the maximum degree of vibration of the central portion of the diaphragm.

The chamber —13—, while shallow, affords ample clearance for the vibration of

the diaphragm without contact with the disk —9—, and inasmuch as the degree of amplitude of the diaphragm is greatest at the center and diminished toward the edges, it follows that the rhythmic vibration of the air in said chamber is greatest at the center, or within the area of the opening —11— in the disk —9—, which, by reason of its proximity, serves to concentrate the sound-waves more closely within the area of the exit tube —15—.

The purposes, therefore, of interposing the non-vibrant disks —9— and —14— between the diaphragm and back of the case are:—

First. To prevent the transmission of sound-waves from the diaphragm to the back of the case and vice versa.

Second. To prevent the commingling of any sound-waves which may be produced by sympathetic vibration of the diaphragm case into the exit leading to the amplifier, and

Third. To increase the fullness or quality of the tones produced by the diaphragm so that they will correspond more closely to the original tones as represented by the sound-producing record.

What I claim is:

1. In a phonographic reproducer, a non-vibrant concavo-convex disk between the diaphragm and back of the case, and provided with an opening registering with the sound-wave exit in the case, said disk having its concave side facing the exit.

2. In a phonographic reproducer, a lining disk of non-vibrant material lying against the inner face of the back of the case, and provided with a tubular hub of the same material fitted within and extending through the sound-wave exit in said case.

3. In a phonographic reproducer, a lining disk of non-vibrant material lying against the inner face of the back of the case and provided with a tubular hub of the same material fitted within and extending through the sound-wave exit in said case, and a concavo-convex disk of non-vibrant material interposed between the diaphragm and said lining disk and provided with a central opening co-axial with and relatively larger than that in the tubular hub, said concavo-convex disk having its concave side facing the lining disk.

In witness whereof I have hereunto set my hand this 21st day of August, 1915.

EDWARD G. SMITH.

Witnesses:

H. E. CHASE,
ALICE M. CANNON.

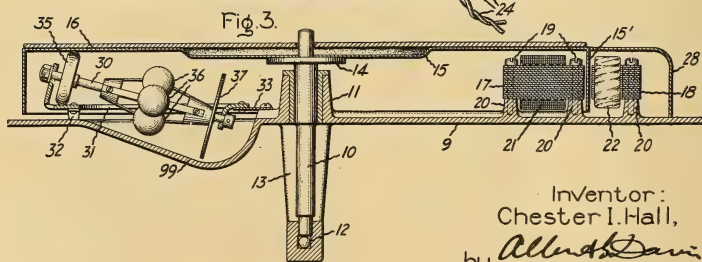
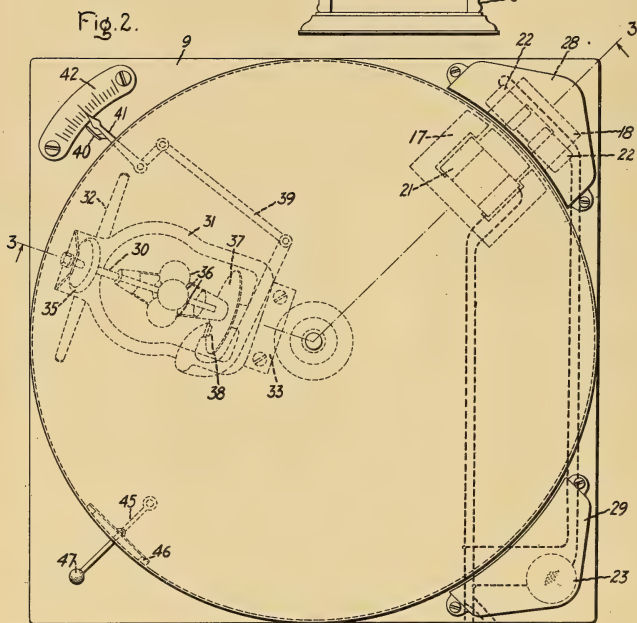
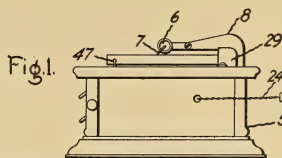
TALKING MACHINE.

1,240,711 ----- C. I. Hall;
Patented - Sept. 18, 1917;
Filed - May 15, 1915.

C. I. HALL.
TALKING MACHINE.
APPLICATION FILED MAY 15, 1915.

1,240,711.

Patented Sept. 18, 1917.



Inventor:
Chester I. Hall,
by *Allen A. Davis*
His Attorney.

UNITED STATES PATENT OFFICE.

CHESTER I. HALL, OF FORT WAYNE, INDIANA, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

TALKING-MACHINE.

1,240,711.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed May 15, 1915. Serial No. 28,819.

To all whom it may concern:

Be it known that I, CHESTER I. HALL, a citizen of the United States, residing at Fort Wayne, county of Allen, State of Indiana, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

My invention relates to talking machines of the disk type and its object is to provide a novel form of electric drive for such machines. Considered in its broadest aspect my invention comprises a rotatable circular member for supporting a disk record and an electric motor so arranged that its driving force is applied to the outer periphery of the member. More specifically the invention comprises a rotatable disk-supporting member from whose periphery depends a rim of conducting material which is adapted to act as the armature of an alternating current induction motor of the induction meter type. The invention further comprises certain other novel and improved features of general application to talking machines.

The novel features which I believe to be patently characteristic of my invention are definitely indicated in the claims appended hereto. The construction of an electrically operated talking machine embodying the novel features of my invention and the mode of operation thereof will be understood from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is an elevation of a talking machine embodying my invention; Fig. 2 is a plan view of the motor board and operating mechanism mounted thereon; and Fig. 3 is a sectional elevation along the line 3—3 of Fig. 2.

The cabinet 5, sound box 6, stylus 7 and supporting arm 8 are of standard design. Within the cabinet is suitably mounted a motor plate 9. The motor plate is preferably formed of cast iron, but it will of course be understood that any other suitable construction may be equally well employed. A vertically positioned shaft 10 is journaled in a boss 11 of the motor plate and is supported by a step bearing 12 in the lower end of a bracket 13 extending downwardly from the motor plate.

A disk or plate 14 is secured near the

upper end of the shaft 10 and supports a cup-shaped member 15 of electrical conducting material, such as aluminum, copper or the like. The member 15 has a flat circular upper surface designed to operatively support a disk record, and to this end is covered with the usual layer 16 of felt, velvet or similar material. The edge or rim of the cup-shaped member 15 is a continuous band 15' of electrical conducting material and depends from the periphery of the circular surface of the member. The shaft 10 and cup-shaped member 15 constitute the rotatable member of the machine, and are driven in the manner now to be described.

In one corner of the motor plate 9 is mounted the magnetic core member of an electric motor of the induction motor type provided with two exciting windings carrying currents which are displaced in phase relatively to one another. In the drawings, I have illustrated this core member as consisting of two parts 17 and 18 arranged with an air gap therebetween. The cup-shaped member 15 is arranged so that its depending band 15' is adapted to rotate through this air gap. The core parts 17 and 18 are made up of bundles of laminated magnetic material secured by screws 19 to bosses 20 extending upwardly from the motor plate 9. In order to secure the necessary phase displacement, the winding on one of the core parts, as for example the core part 17, is preferably given a higher inductance by providing the core with three parallel legs, as in the type of induction motor now commonly employed in induction watt-hour meters. Upon the middle leg of the core part 17 is mounted the exciting or energizing coil 21. A large portion of the flux set up by the coil 21 passes through the approximately closed magnetic circuits in the core part 17 and does not pass across the air gap, whereby the coil 21 has relatively high inductance. The core part 18 is generally U-shaped and carries an exciting or energizing coil 22 on each leg thereof. Substantially all the flux set up by the coils 22 passes across the air gap between the core parts 17 and 18, and the coils 22 thus have relatively low inductance compared with the coil 21. The coil 22 is, furthermore, con-

5 nected in series with an incandescent lamp
23 positioned in another corner of the motor
plate 9. The resistance of the lamp 23 is
substantially non-inductive, and is relatively
10 much larger than the resistance of the coils
22, so that when the coil 21 is connected to
an alternating current circuit, such as an
ordinary alternating current lighting cir-
cuit, and the coils 22 with their associated
15 lamp are connected in parallel therewith,
there will be a sufficient phase displacement
between the currents flowing in the two cir-
cuits to cause the disk to be rotated in a
simple and highly efficient manner.

20 The coil 21 is designed to be connected di-
rectly across a suitable source of alternating
current energy and the coils 22 with the
series-connected lamp 23 are similarly de-
signed to be so connected. To this end the
coils and lamp are connected to lead wires
24, as indicated by the heavy dotted lines in
Fig. 2 of the drawings. The lead wires, as
illustrated, are of the twisted cord type and
extend from a suitable opening in the cabi-
25 net 5, and are provided with a standard
plug 25 for insertion in an ordinary electric
lamp socket.

The core part 17 and energizing coil 21 are
positioned beneath the cup-shaped member
30 15 and are therefore covered by such mem-
ber. The core part 18 and energizing coils
22 are provided with a cover 28 screwed to
the motor plate 9. The lamp 23 is pro-
vided with a similar cover 29. The dimen-
35 sions of the lamp cover 29 are so propor-
tioned that light from the lamp sweeps over
the top of the rotatable member, whereby
illumination is obtained for changing rec-
ords and needles.

40 It will be well understood by those skilled
in the art that the electromagnetic means in-
cluding the magnetic core member and en-
ergizing coils produces a shifting magnetic
field across the air gap between the core
45 parts 17 and 18. The depending band 15'
of the cup-shaped member is arranged to ro-
tate in this air gap. The shifting magnetic
field sets up induced currents in the conduct-
ing material of the member 15, and causes
50 the member to rotate in the well understood
manner. It will thus be seen that the mag-
netic core member and energizing coils co-
öperate with the cup-shaped member of
electrical conducting material to form an
55 electric motor of the induction motor type.

A speed governor of the centrifugal fric-
tion type is mounted on the motor plate 9
beneath the cup-shaped member. This gov-
ernor is driven directly from the cup-shaped
60 member by friction, thereby eliminating any
noise otherwise occasioned by gearing. The
shaft 30 of the governor is mounted on a
frame 31 supported upon the motor plate
by means of springs 32 and 33. The motor
65 plate is recessed at 99 for the suitable ac-

commodation of the governor parts. A
wheel 35 is secured to the shaft 30 and has
a peripheral surface of felt or similar ma-
terial. The periphery of the wheel is in en-
70 gagement with the lower face of the cup-
shaped member 15. The resilient tendency
of the springs 32 and 33 presses the wheel
upwardly and insures a good friction driv-
ing contact between the wheel and the cup-
shaped member.

75 Centrifugal governor balls 36 are opera-
tively mounted on the shaft 30, and are ar-
ranged to move a friction disk 37 along the
shaft in response to changes in speed of the
rotatable member of the machine. A fric-
80 tion pad 38 is operatively related to the
friction disk 37, and is adapted to be moved
with respect to the disk by means of a link-
age or lever mechanism 39. The friction be-
tween the disk 37 and the pad 38 has a brak-
85 ing action upon the rotatable member and
operates to maintain substantially constant
any desired operating speed of the member.
The lever mechanism 39 is adapted to be op-
erated by a handle 40. A pointer 41 co-
90 operates with a scale 42 to indicate the speed
which the friction pad is adjusted to main-
tain approximately constant. As will be
observed from Fig. 2 of the drawings, the
handle 40, pointer 41 and scale 42 are posi-
95 tioned in the third corner of the motor plate
9. The lever mechanism and governor con-
stitute a speed changing device, since the
lever mechanism moves the friction pad 38
toward or away from the friction disk 37
100 to vary the position at which the governor
balls begin to act.

Rotation of the rotatable member of the
machine is prevented by a brake 45. This
105 brake comprises friction pads 46 adapted to
bear against the inner surface of the de-
pending band of the cup-shaped member and
an operating handle 47. The operating
handle 47 is located in the fourth corner of
the plate 9. The energizing coils of the
110 electromagnetic motive means are in circuit
during the entire time of the operation of
the machine, and rotation of the rotatable
member is interrupted for the purpose of
changing records, needles and the like, by
115 means of the brake 45. It will of course be
understood that the supply of electric en-
ergy to the energizing coils can be inter-
rupted at will by any suitably positioned
or operated switch, as, for example, by the
120 usual switch in the lamp socket into which
the plug 25 is screwed.

It will be observed from the foregoing
description that I have provided a very sim-
125 ple and cheap electrically operated talking
machine. The driving force of the motor
is applied to the outer periphery of the ro-
tatable support for the disk record, and the
force necessary for driving the support is,
130 accordingly, much smaller than if applied

directly to the shaft of the support, since the lever arm at which a force applied to the outer periphery of the support acts is many times longer than in the case of a force applied directly to the shaft of the support. The motor may, therefore, be relatively smaller when its driving force is applied to the outer periphery of the support. In the particular embodiment of the invention which I have herein illustrated for explanatory purposes a single rotatable member serves both as the armature of the electric driving motor and as the record carrying medium. The electromagnetic motive means is of very simple construction, consisting only of bundles of laminations of magnetic material and of simple coils of wire. The electric current consumption is low, being in ordinary machines not more than about 30 watts, of which the greater part is consumed in the lamp. The use of the lamp as the non-inductive load for the induction motor element provides illumination of the machine, which is particularly convenient in changing records and needles. The speed regulation and brake for stopping the machine are of the type now well known to operators of spring-motor driven talking machines, and thus no operating difficulties are encountered in my improved electrically driven machine by the layman familiar with the operation of the spring-motor driven machines. Those skilled in the art will recognize that my invention may be embodied in various forms. I, accordingly, do not wish to be restricted to the specific construction herein illustrated and described, but aim in the appended claims to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An electrically operated talking machine comprising a rotatably mounted member having a flat circular horizontal surface for supporting a disk record and a continuous band of electrical conducting material depending from the periphery of such circular surface, a magnetic core member having an air gap through which said band is adapted to rotate, and magnetizing coils carried by said core member for producing a shifting magnetic field across said air gap.

2. An electrically operated talking machine comprising a rotatably mounted member having a flat horizontal surface for supporting a disk record, and a depending band of electrical conducting material, a magnetic core member having an air gap through which said band is adapted to rotate, an energizing coil mounted on said core member, a substantially non-inductive resistance, and another energizing coil mounted on said core member and connected in series relation with said resistance.

3. An electrically operated talking machine comprising a rotatably mounted member having a flat circular upper surface for supporting a disk record and a continuous band of electrical conducting material depending from the periphery of such circular surface, a magnetic core member having an air gap through which said band is adapted to rotate, an energizing coil mounted on said core member, a substantially non-inductive resistance, and another energizing coil mounted on said core member and connected in series relation with said resistance.

4. An electrically operated talking machine comprising a rotatably mounted member carrying an armature of electrical conducting material and provided with means for supporting a record, a magnetic core member having an air gap through which said armature is adapted to rotate, a magnetizing coil provided by said core member with two magnetic circuits for the flux developed therein one a substantially closed magnetic circuit of low reluctance and the other a magnetic circuit including said air gap and of relatively high reluctance, a second magnetizing coil provided by said magnetic core with a magnetic circuit including said air gap and of relatively high reluctance, and a non-inductive resistance connected in series with said second magnetizing coil.

5. An electrically operated talking machine comprising a rotatably mounted member carrying an armature of electrical conducting material and provided with means for supporting a record, a magnetic core member having an air gap through which said armature is adapted to rotate, an energizing coil mounted on said core member so that the greater portion of the flux developed by said coil has a substantially closed magnetic circuit, a substantially non-inductive resistance, and another energizing coil mounted on said core member and connected in series with said resistance and having small ohmic resistance as compared with said non-inductive resistance.

6. An electrically operated talking machine comprising a rotatably mounted member carrying an armature of electrical conducting material and provided with means for supporting a record, and electromagnetic means including a magnetic core member energizing coils and an incandescent lamp operatively related to said armature and forming therewith an electric motor of the induction motor type, said incandescent lamp being electrically connected in series with one of said coils and adapted to make the electric circuit of such coil substantially non-inductive.

7. An electrically operated talking machine comprising a rotatably mounted member carrying an armature of electrical con-

ducting material and provided with means
for supporting a record, and electromagnetic
means including a magnetic core member
energizing coils and an incandescent lamp
5 operatively related to said armature and
forming therewith an electric motor of the
induction motor type, said incandescent lamp

being adapted to provide said electromag-
netic means with a substantially non-induc-
tive load and being positioned to illuminate 10
said rotatable member.

In witness whereof, I have hereunto set
my hand this 12th day of May, 1915.

CHESTER I. HALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

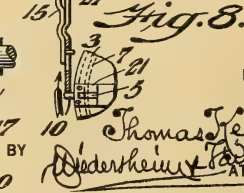
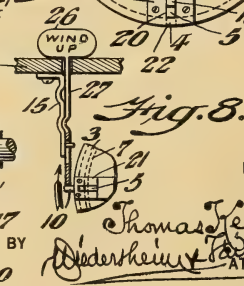
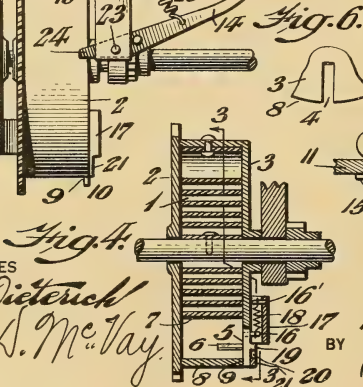
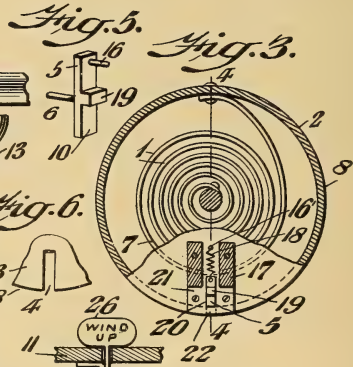
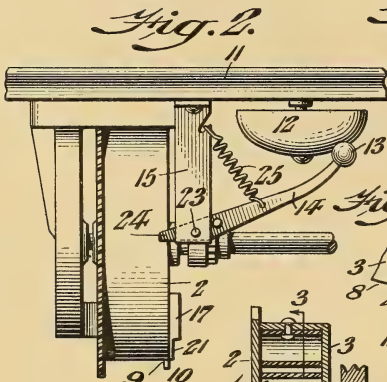
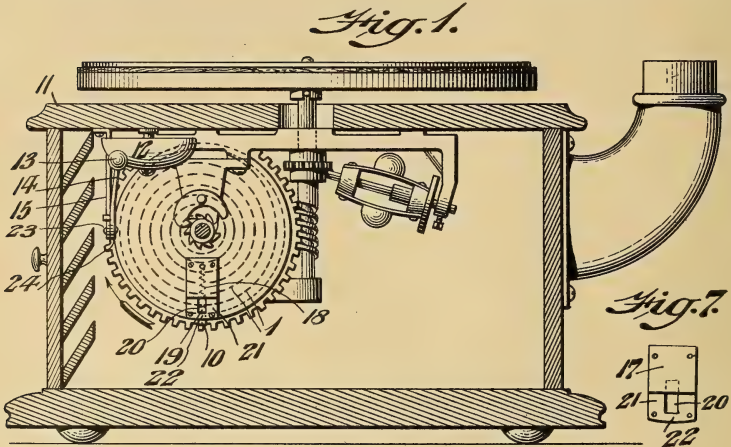
WINDING SIGNAL FOR A TALKING MACHINE.

1,240,730 ----- T. Keepfer;
Patented - Sept. 18, 1917,
Filed - Nov. 27, 1916.

T. KEEFER.
WINDING SIGNAL FOR A TALKING MACHINE,
APPLICATION FILED NOV. 27, 1916.

1,240,730.

Patented Sept. 18, 1917.



WITNESSES

H. E. Dieterich

C. A. McVay

INVENTOR

Thomas Keefe
Dieterich & Banks
ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS KEEFFER, OF PHILADELPHIA, PENNSYLVANIA.

WINDING-SIGNAL FOR A TALKING-MACHINE.

1,240,730.

Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed November 27, 1916. Serial No. 133,652.

To all whom it may concern:

Be it known that I, THOMAS KEEFFER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Winding-Signal for a Talking-Machine, of which the following is a specification.

My invention consists in providing a talking machine with a device which will signal the running down or approximate running down of the spring or motor employed, and direct attention to the fact that re-winding is requisite, the signal being either audible or visual.

The invention is satisfactorily illustrated in the accompanying drawing, but the important instrumentalities thereof may be varied, and so it is to be understood that the invention is not limited to the specific details shown and described.

Figure 1 represents a longitudinal vertical section of a portion of a talking machine showing my invention applied thereto.

Fig. 2 represents a side elevation thereof.

Fig. 3 represents a section of a portion on line 3—3 Fig. 4.

Fig. 4 represents a section thereof on line 4—4 Fig. 3.

Fig. 5 represents a perspective view of a detached member on an enlarged scale.

Fig. 6 represents a side elevation of a portion of the spring-casing or cylinder of the device.

Fig. 7 represents a side elevation of a detached member of the device.

Fig. 8 represents a partial side elevation and a partial longitudinal section of another embodiment of my invention.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—

1 designates the spring employed as a motor for the rotation of the record turntable of a talking machine, and 2 designates the cylinder or casing therefor. In the side wall 3 of said cylinder is the slot 4 which extends radially therein, in the present case from the periphery thereof and has in it the sliding dog 5 which has on its inner face the finger or pin 6 which extends rearwardly therefrom into the cylinder 2, so as to be at a certain time in the path of the outer convolution or coil 7 of the spring 1, it being noticed that the peripheral wall 8 of said cylinder has therein the opening 9 through which at one time the outer terminal or nose

portion 10 of the dog 5 is adapted to protrude as shown in Fig. 2 and at another time said portion is adapted to remain in said opening as shown in Fig. 4.

To the underside of the top 11 of the cabinet of the machine is secured the bell 12 whose hammer 13 is carried on the arm or lever 14 which is mounted on the hanger 15 on said cabinet. To the outer face of said dog 5 is secured the pin 16 which projects outwardly therefrom and enters the box 17 which is secured to the side wall 3 of the cylinder 8 and has connected with it one end of the spring 18 whose other end is secured within said box 17 as to the pin 16, see Figs. 3 and 4. On the outer face of said dog 5 adjacent to the pin 16 is the shoulder 19 which is adapted to play in the slot 20 in the plate 21 which carries the box 17, said plate being fastened also to the wall 3 of the cylinder 2. The wall 22 of the outer terminal of said slot 20, see Figs. 3 and 7, forms a stop for the abutment therewith of the shoulder 19 to limit the outer motion of the dog 5, see Fig. 1.

The bell carrying lever 14 is extended beyond its axis 23 on the hanger 15 forming the heel 24 which occupies a position exterior of the circumferential wall of the casing 2 of the spring 1 so as to be in the path of the nose portion 10 of the dog 5, whereby said lever will be tripped, when the spring 25 which is connected with the arm or lever and the hanger 15 will cause its hammer 13 to strike the bell 12, as will be hereinafter more fully explained.

The operation is as follows:—

The spring 1 is wound as usual thus rotating the record holder as well known, it being evident that the spring is contracted and its outer coil or convolution is removed from the finger 6. This allows the spring 18 to be operative so as to draw back the dog 5 whereby its nose portion 10 enters the slot 9 so as to avoid its projection beyond the peripheral wall 8 of the cylinder 2, see Fig. 4, and so as said cylinder rotates, the nose portion 10 of the dog is removed from the heel 24 of the lever 14 and so will not engage the same, but as usual the spring 1 unwinds and so expands its convolutions or coils gradually spreading when the outer convolution or coil contacts with the finger 6 pressing the same and so forcing the dog from its position at rest whereby its nose portion 10 emerges from the slot 9 in the periphery of

the cylinder 2, and when the spring 1 is just about completely unwound or uncoiled, said portion 10 projects from said periphery to such extent, see Fig. 2, that when it reaches the heel 24 of the lever 14, it bears against and rides over the same so as to trip said lever, whereby the hammer 13 is drawn back from the bell 12 and then the spring 25 causes a quick return motion of said lever whereby the bell is struck signaling audibly the run down condition of the spring or power of the machine.

If desired, the signal may be visual, in which case I may employ in lieu of the bell 12, the indicator plate 26 which is secured to the top of the slide or sliding rod or bar 27 which passes freely through a slot in the top 11 of the cabinet, and it is guided on the hanger 15, it being so disposed in relation to the dog 5 as to have its lower end engaged by the nose portion of said dog, whereby the plate will be raised, thus indicating the unwound condition of the power spring of the machine.

After said nose clears the slide 27, the latter drops and with it the plate 26 which then occupies its normal position close to the table 11 indicating that the said spring has been wound or is sufficiently wound to operate the record turntable.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a talking machine, a casing rotatably mounted, a motor spring attached to said casing, a movable member on said casing having an inwardly projecting part for contact by said spring as the latter unwinds, said member being adapted to be projected from the casing by the spring when the latter is nearly run down, and a signal having a member in the path of the first-named means to be operated by the rotation of the casing.

2. In a talking machine, a casing rotatably mounted, a motor spring attached to said casing, a movable member on said casing having an inwardly projecting part for contact by said spring as the latter unwinds, said member being adapted to be projected from the casing by the spring when the latter is nearly run down, a signal having a member in the path of the first-named means to be operated by the rotation of the casing, and a spring attached to the first-named member for normally holding it in its retracted position.

3. In a talking machine, a casing rotatably mounted, a motor spring attached to

said casing, a movable member on said casing having an inwardly-projecting part for contact by said spring as the latter unwinds, said member being adapted to be projected from the casing by the spring when the latter is nearly run down, a signal having a member in the path of the first-named means to be operated by the rotation of the casing, a spring attached to said first-named member for normally holding it in its retracted position, a plate secured to said casing and having a slot, a container for the last-named spring carried by said plate and to which said spring is attached, and a stop member projecting from said movable member and freely movable in said slot.

4. In a talking machine, a rotatably mounted casing, a motor spring therein and connected therewith, a dog mounted to be projected from said casing by the spring when the latter is nearly run down, a signal proper, a member of the latter being in the path of the projected end of said dog, and means for holding said dog normally engaged with the coil of said spring in the wound condition thereof.

5. In a talking machine, a motor spring, a rotatably mounted casing therefor, said casing being rotatable with said spring, a member movable within a slot in the wall of said casing and having a member projecting within the casing for engagement by said spring as it unwinds, and a nose portion projectible through an opening in the periphery of said casing by the spring when the latter is nearly run down, and a movably mounted signal having a portion arranged in the path of said nose when projected by the unwinding of the spring.

6. In a talking machine, a motor spring, a rotatably mounted casing therefor, said casing being rotatable with said spring, a member movable within a slot in the wall of said casing and having a member projecting within the casing for engagement by said spring as it unwinds, and a nose portion projectible through an opening in the periphery of said casing by the spring when the latter is nearly run down, and a movably mounted signal having a portion arranged in the path of said nose when projected by the unwinding of the spring, said signal being normally disconnected from said projecting portion.

THOMAS KEEFER.

Witnesses:

JOHN A. WIEDERSHEIM,
N. BUSSINGER.

PHONOGRAPH TONE ARM JOINT.

M. Clark ----- Patented Sept. 25, 1917.

Filed Apr. 5, 1917.

M. CLARK.
 PHONOGRAPH TONE ARM JOINT.
 APPLICATION FILED APR. 5, 1917.

1,240,943.

Patented Sept. 25, 1917.

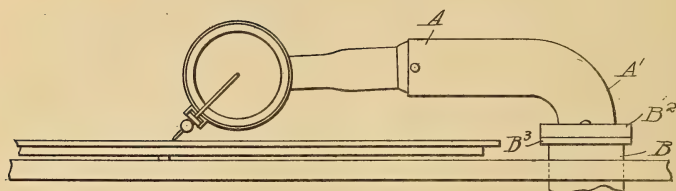


Fig. 1.

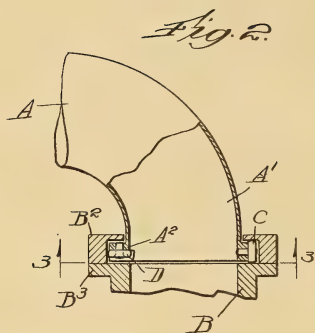
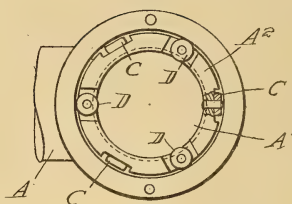


Fig. 3.



Witness:
C. S. Smith

Inventor:
 Melville Clark,
 by *Burton Burton*
 his Atty.

UNITED STATES PATENT OFFICE.

MELVILLE CLARK, OF CHICAGO, ILLINOIS, ASSIGNOR TO MELVILLE CLARK PIANO COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH-TONE-ARM JOINT.

1,240,943.

Specification of Letters Patent.

Patented Sept. 25, 1917.

Application filed April 5, 1917. Serial No. 159,891.

To all whom it may concern:

Be it known that I, MELVILLE CLARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonograph-Tone-Arm Joints, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved bearing joint for the tone arm of a talking machine for its swinging movement over the record. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of a portion of a phonograph comprising the tone arm and adjacent portion of the sound conduit equipped with this invention.

Fig. 2 is a detail vertical section axial with respect to the tone arm joint.

Fig. 3 is a section at the line, 3—3, on Fig. 2.

The drawings show in a conventional manner the tone arm and sound box of a phonograph with the adjacent portion of the sound conduit and the record support and record thereon, the invention relating solely to the portions constituting the joint for connection of the tone arm with the adjacent portion of the conduit for swinging the tone arm horizontally over the record for playing. The tone arm, A, terminates for said joint in a downwardly-extending elbow arm, A¹, which has a flange, A², transverse to the vertical axis of the joint, that is, the axis about which said tone arm swings, which is the vertical axis of the adjacent fixed sound conduit member, B, upon which said tone arm is mounted for said swinging movement. On said flange there are journaled rollers constituting two sets, the individuals of which alternate with each other about the axis of said swinging movement, the rollers, C, of one set having their axes radial with respect to the axis of said swinging movement,—that is, for rolling in

vertical planes,—and the rollers, D, of the other set having their axes parallel to the axis of the swinging movement,—that is, for rolling in horizontal planes. The said sound conduit member, B, has at its upper end an inwardly-open annular track which is formed most conveniently by an interiorly-rabbeted or inwardly-flanged collar, B², secured upon the upper side of an outwardly-turned flange, B³, of said sound conduit member, said annular track being positioned and proportioned to accommodate both sets of rollers, the set of rollers, D, being engaged between the upper and lower sides of said annular track, while the rollers, D, travel upon the back or vertical wall of said track. The second set of said rollers, it will be observed, serve to center the swinging tone arm co-axially with the adjacent member of the sound conduit, B, and relieve the friction of the swinging movement which might otherwise result from the tendency to horizontal movement of the tone arm bodily, while the first set of rollers positions the tone arm vertically by their engagement between the top and bottom walls of said track, and relieve the friction of said swinging movement due to the overhanging weight of the tone arm.

I claim:—

1. In a talking machine, a tone arm and a sound conduit member upon which it is supported for swinging over the record, said member having an annular track transverse to, opening toward, and encompassing the axis of said swinging movement, and the tone arm having at the end which engages said conduit member two sets of rollers, those of one set having their axes radial, and those of the other set having their axes parallel to said first-mentioned axis, both sets being engaged with said annular track.

2. In a talking machine, a tone arm and a sound conduit member upon which it is supported for swinging over the record, said member having an annular track transverse to, opening toward, and encompassing the axis of said swinging movement, and the tone arm having at the end which engages

said conduit member two sets of rollers, the individuals of which alternate with each other in circumferential order about said axis, those of one set having their axes radial, and those of the other set having their axes parallel to said first-mentioned axis,

both sets being engaged with said annular track.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 2nd day 10 of April, 1917.

MELVILLE CLARK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

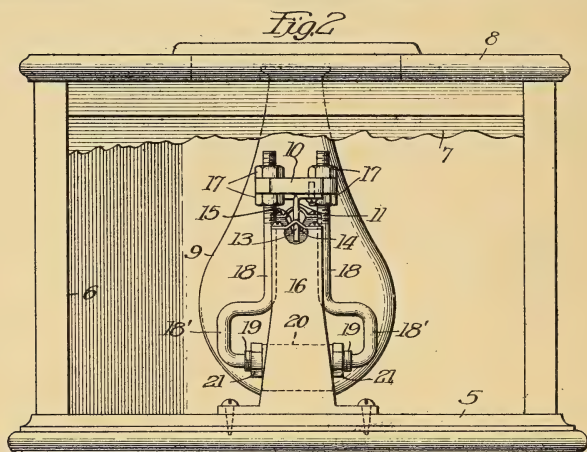
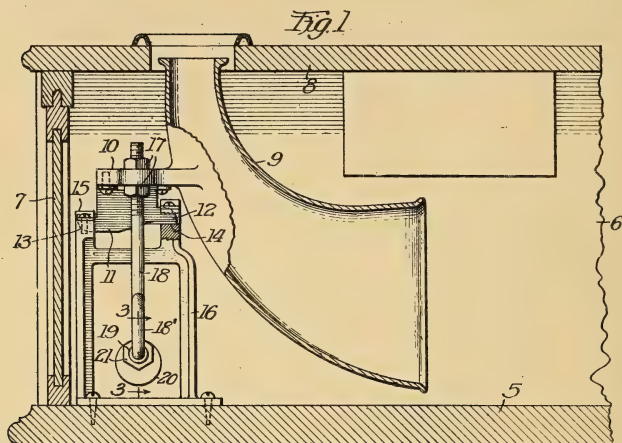
COUNTERBALANCE FOR PHONOGRAPH HORNS.

A. A. Huseby ----- Patented Sept. 25, 1917
Filed Apr. 18, 1917.

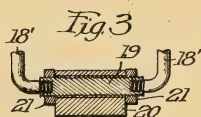
A. A. HUSEBY.
 COUNTERBALANCE FOR PHONOGRAPH HORNS.
 APPLICATION FILED APR. 18, 1917.

1,241,119.

Patented Sept. 25, 1917.



WITNESS
 Leonard W. Novander.



INVENTOR.
 Albert A. Huseby
 BY Pond & Wilson
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

COUNTERBALANCE FOR PHONOGRAPH-HORNS.

1,241,119.

Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed April 18, 1917. Serial No. 162,876.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Counterbalances for Phonograph-Horns, of which the following is a specification.

This invention relates to the general art of phonographs or talking machines, and has reference more particularly to an improved means for counterbalancing horns of that type wherein the horn or sound conveyor, including what is commonly known as the tone arm, is mounted to oscillate radially of the record disk and is supported on a single horizontal pivot or bearing below the usual table which divides the machine cabinet into upper and lower compartments, accommodating the tone arm, reproducer, turntable and record disk on the one hand, and the motor mechanism and amplifier on the other. A talking machine of this type employing a sound conveyor or horn of the character to which the present improvements are applied is illustrated in my former Patent No. 1,198,636, dated September 19, 1916.

The general object of the present invention is to provide a counterbalance mechanism of greater sensitiveness and accuracy than those heretofore used; more specific objects being to provide a mechanism wherein the weight proper shall be capable of adjustment not only vertically with relation to the pivot but also laterally so as to correct any slight error and render the balancing of the horn in all positions as perfect as possible, to provide a mechanism wherein the horn shall be so delicately balanced that the lateral thrust of the record groove on the stylus shall be practically limited to only such as is necessary to overcome the slight friction of the pivot bearing, and to provide a counterbalance mechanism of simple and cheap construction and readily capable of adjustment without the necessity of disassembling the parts.

With these and other minor objects in view which will be apparent from the following description, the invention consists in the improved counterbalance mechanism hereinafter described and definitely pointed out in the appended claims.

My invention, its principle of operation, and the advantages inherent therein will

readily be apparent to those familiar with this art from the following description taken in connection with the accompanying drawing forming a part of this specification, wherein—

Figure 1 is a vertical section through the lower compartment of a talking machine cabinet and the horn, showing my improved counterbalance mechanism in side elevation as applied to the horn;

Fig. 2 is a rear elevational view of the same parts as seen from the left of Fig. 1;

Fig. 3 is a sectional detail on the line 3—3 of Fig. 1.

Referring to the drawing, 5 designates the bottom wall, 6 a side wall, 7 a removable rear wall or panel, and 8 the top wall of the lower compartment of an ordinary talking machine cabinet, the top wall 8 representing the horizontal partition, to the underside of which is usually attached the motor and its controlling mechanism, and above which is mounted the usual turntable that supports the record disk. 9 designates the lower section of the sound conveyor that is coupled at its upper end to the upper or tone arm section (not shown) and is commonly known as the horn. On the horn 9 is a rearwardly extending lug 10, to the underside of which is bolted a depending hinge member 11 carrying on its forward and rear edges knife-edge pintles, 12 and 13 respectively, that engage relatively inverted V-shaped bearings, 14 and 15 respectively, formed on the upper end of a skeleton supporting frame designated as an entirety by 16, this latter resting upon and being secured to the floor or base 5 of the cabinet.

Secured in the opposite sides of the lug 10 by supporting and adjusting nuts 17 are a pair of depending rods 18, each of which has an outwardly bowed lower portion 18', the extreme lower ends of these rods being turned inwardly and threaded, and engaging in the opposite ends of an externally threaded horizontal member 19 which serves as a coupling for, as well as being supported by, the lower ends of the rods. Slidably mounted on the threaded member 19 is the counterweight proper 20. This counterweight may be adjusted, and confined in adjusted position, lengthwise of the member 19 by means of a pair of nuts 21 on the member 19 that engage the opposite ends of the counterweight.

Primary adjustment of the counterweight in a vertical direction relatively to the pivot is secured by manipulation of the nuts 17, by which the effective length of the weight-suspending means is adjusted so that the portion of the sound conveyer below the horizontal pivot or axis will substantially counterbalance the portion above said axis in all positions or angles of the sound conveyer. In case the vertical halves of the sound conveyer should not exactly balance each other, or the axis of the hinge bearing should not exactly coincide with the vertical median plane of the sound conveyer, so that the latter normally tends to hang slightly to one side or the other, this can be corrected by a horizontal adjustment of the counterweight 20 to one side or the other in the manner already described. By means of both the vertical and horizontal adjustability of the counterweight, I am enabled to obtain a very delicate and sensitive balance of the sound conveyer and thereby greatly reduce the wear of the record that results from the lateral thrust of the record groove against the point of the stylus to effect the necessary swinging of the sound conveyer as it travels from the outermost to the innermost groove of the record. It will be manifest to those skilled in the art that the specific details of the mechanism herein described and shown may be considerably varied without departing from the principle or sacrificing any of the advantages thereof. Hence, I do not limit the

invention to the details disclosed except to the extent indicated in specific claims.

I claim:

1. In a mechanism of the character described, the combination with a sound conveyer, of a stationary supporting member having bearings, a hinge member rigid with said sound conveyer and having pintles engaging said bearings, a pair of spaced rods suspended from said hinge member on opposite sides of the axial line of said bearings respectively, a horizontal member supported by and between the lower ends of said rods, a counterweight slidably mounted on said horizontal member, and means for securing said counterweight in any adjustable position on said horizontal member.

2. In a mechanism of the character described, the combination with a sound conveyer, of a stationary supporting member having bearings, a hinge member rigid with said sound conveyer and having pintles engaging said bearings, a pair of spaced rods suspended from said hinge member on opposite sides of the axial line of said bearings respectively and formed with inwardly turned lower ends, an externally threaded horizontal member having hollow ends by which it is supported by and between the inturned ends of said rods, a counterweight slidably mounted on said horizontal member, and nuts on said horizontal member engaging the opposite ends of said counterweight.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

STOP MECHANISM

W. H. Miller ----- Patented Sept. 25, 1917,

Filed July 6, 1916.

W. H. MILLER.
STOP MECHANISM.
APPLICATION FILED JULY 6, 1916.

1,241,416.

Patented Sept. 25, 1917.

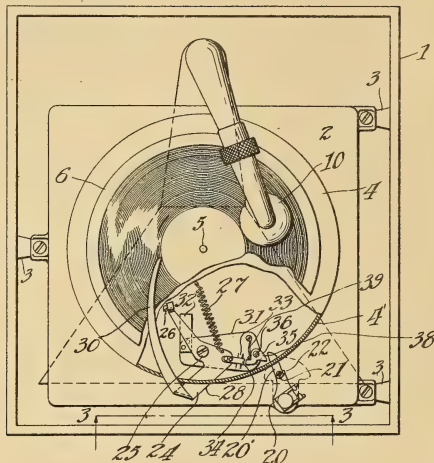


Fig. 1

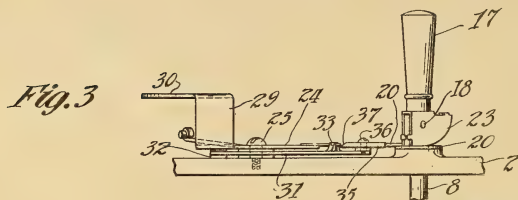


Fig. 3

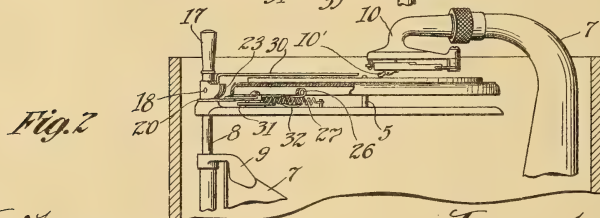


Fig. 2

Witnesses:
A. L. Fisher
J. Unger

Inventor:
Walter H. Miller
by Frederick Dickmann
his Atty.

UNITED STATES PATENT OFFICE.

WALTER H. MILLER, OF ORANGE, NEW JERSEY.

STOP MECHANISM.

1,241,416.

Specification of Letters Patent.

Patented Sept. 25, 1917.

Application filed July 6, 1916. Serial No. 107,724.

To all whom it may concern:

Be it known that I, WALTER H. MILLER, a citizen of the United States, and a resident of Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Stop Mechanisms, of which the following is a description.

My invention relates to stop mechanisms designed particularly for automatically stopping the rotation of the turntable of a phonograph or talking machine when the reproducer stylus of such a machine has reached a predetermined position with respect to the phonograph or sound record carried by the turntable, but the invention is not limited to this use. The principal object of my invention is to provide an improved device of the class referred to which is of simple and cheap construction and which is easy to operate. One of the features of the invention is the provision of a single device or member by which the stop mechanism may be rendered inoperative so as to permit the rotation of the turntable, and by which also the predetermined relative position between the stylus and record at which the stop mechanism is applied to stop the rotation of the turntable may be varied at will. Other objects of my invention will appear more fully in the following specification and appended claims.

In order that my invention may be more clearly understood, attention is directed to the accompanying drawing forming a part of this specification, in the several views of which corresponding parts are designated by the same reference characters, and in which:

Figure 1 is a plan view, partly broken away, of a phonograph equipped with a stop mechanism in accordance with my invention.

Fig. 2 is a side elevation of the apparatus shown in Fig. 1, the cabinet of the phonograph being shown in section and the record support being partly broken away; and

Fig. 3 is an enlarged sectional view taken on line 3—3 of Fig. 1 showing a detail of construction.

Referring to the drawing, reference character 1 designates the cabinet of a well known type of phonograph in the upper portion of which a horizontal plate or support 2 is suitably secured to the brackets 3, which are fixed to the inner walls of the cabinet. A horizontal record support or

turntable 4 having a depending circumferential flange 4' is suitably mounted above the top plate 2 on a vertical shaft 5. The shaft 5 extends downwardly through the top plate 2 and is adapted to be actuated to rotate the support 4 and the record 6 thereon by means of a suitable motor (not shown) preferably located just beneath top plate 2. Reference character 7 represents the horn or amplifier of the phonograph which is secured to a vertical rod 8 located adjacent the front of the cabinet 1 by means of brackets, one of which is shown at 9 in Fig. 2. The horn 7 extends from rod 8 rearwardly below the top plate 2, then upwardly past the top plate and record support, and then forwardly above the record support. A reproducer or sound box 10 is secured to the small end of the horn 7 in a position above the record support 4. The reproducer shown is of the type described and claimed in United States Patent No. 1,055,621 to Thomas A. Edison, dated March 11, 1913. The reproducer stylus which traverses the record is shown at 10' in Fig. 2. The vertical rod 8 by which the horn and reproducer are entirely supported is pivotally mounted in a suitable bearing in the top plate 2 and another bearing (not shown) below the horn, said vertical rod constituting means whereby the horn and reproducer are mounted for swinging movement about a vertical axis to permit the reproducer 10 to travel across the record 6. The rod 8 is also movable vertically and longitudinally in its bearings to thereby effect bodily vertical movement of the horn and reproducer to effect movement of the reproducer into and out of operative position with respect to the record support 4 and the record 6 carried thereby. The longitudinal or vertical movement of the rod 8 in its bearings to effect the raising and lowering of the horn and reproducer is controlled by member 17 pivoted at 18 to the upper end of the rod 8, the latter projecting above the top plate. A member 20 in the form of a flat plate is slidably but non-rotatably mounted on the rod 8 between the member 17 and the top plate 2. The member 17 bears on plate 20, and the latter accordingly serves to transmit the weight of rod 8 and the parts carried thereby to the top plate 2. Pivotally mounted on the outer end of the plate 20 is a finger 20', the function of which will appear more fully here-

inafter. This finger normally turns with the plate 20 and the horn, being secured to said plate by a screw 21, but by loosening said screw said finger may be angularly adjusted with respect to the said plate. The finger 20' has a downwardly projecting portion 22 the forward edge of which, referring to Fig. 1, is arranged to abut against a shoulder on the plate 20 to limit the rotation of the finger in a clockwise direction. The member 17 comprises a handle and a cam portion 23 secured to the handle and engaging the member 20. When the handle of member 17 is in a vertical position, as shown in Fig. 2, flat surfaces of the cam portions 23 engage the member 20 to support the rod 8 and horn 7 and the reproducer 10 in their lowermost positions. Upon turning the member 17 about pivot 18 from the position shown in Fig. 2 to a position at right angles thereto, the curved surfaces of cam portions 23 coact with the member 20 to lift the rod 8, horn 7 and reproducer and to support the same in their raised or elevated positions. When the horn 7 is in its lowermost position, as shown in Fig. 2, the reproducer is in operative position, the stylus thereof tracking the groove of the record 6, and suitable feeding mechanism (not shown) is operative to turn the horn about the axis of the vertical rod 8 so as to move the reproducer across the record 6 toward the center thereof at substantially the same rate as the record groove feeds the stylus across the record. When the rod 8 and horn 7 are moved to their uppermost position by means of the member 17, the reproducer 10 is carried to inoperative position with respect to the record, and the feeding mechanism for moving the reproducer across the record is rendered inoperative in a manner fully described and shown in United States patent to Thomas A. Edison, No. 1,184,333, dated May 23, 1916.

The brake mechanism for the phonograph comprises a lever 24 which is pivotally mounted, as by means of a screw or pin 25, above the top plate 2 and below the record support 4. One arm of the bell crank lever 24 is provided with a friction brake 26 adapted to engage the inner surface of the flange 4' of the record support to arrest the rotation of the latter. A spring 27 connected at its ends respectively to the top plate 2 and to the lever 24 constantly tends to turn the latter about its pivot to operative position with the brake 26 in engagement with the flange 4' on the record support. The arm of the lever 24 other than that carrying the friction pad 26 is provided with a portion extending forwardly as shown at 28, then upwardly as shown at 29, and then horizontally above the record support 4 as shown at 30. Between the

lever 24 and the top plate is a flat member or plate 31 which is pivotally connected to the top plate by screw or pin 25, and which is normally held against rotation about said screw or pin, as by a spring 32 which is secured to the member 31 and bears upon the upper surface of the top plate 2. The member or plate 31 is provided with an elevated detent portion 33 which has in the top thereof a seat for the spring 34 secured to lever 24. The forward and rear portions of the detent or elevation 33, referring to Fig. 1, are inclined upwardly toward the said seat, so that the spring 34 may be engaged with said detent by turning the lever 28 so as to bring said spring above said detent, the spring sliding upwardly on the detent and finally snapping into the seat therein. A dog 35 is pivoted to the plate 31, as at 36. This dog is provided with an inclined face 37 which is arranged to lift the spring 34 out of the recess or seat in the detent 33 and permit the spring 27 to turn the lever 28 about its pivot. The movement of the dog 35 to release the spring from the detent 33 is effected by the engagement of the finger 20' with the cam surfaces 38 on said dog. A spring 39 tends to move the dog away from the elevation or detent 33. The finger 20' is fed to the left, referring to Fig. 1, during the travel of the reproducer stylus from the periphery toward the center of the record; and it will be seen that by turning the member or plate 31 about its pivotal axis against the action of spring 32, the finger 20' may be made to operate the releasing dog 35 to cause the operation of the brake at points corresponding with the different relative positions of the reproducer stylus with respect to the record. To facilitate the predetermination of the relative position of the stylus with respect to the record at which the stop mechanism is put into operation to stop the rotation of the record support, the horizontal portion 30 of the brake lever is formed in the shape of an index, the inner or extreme end of this horizontal portion being pointed. When the spring 34 is held in the detent 33, the pointed end of the finger is located over the particular groove in the record in which the stylus will be located when the finger 20' moves into engagement with the cam surface 38 of the dog 35. The action of the spring 32 tending to prevent rotation of the plate 31 about pivot 25 is stronger than that of spring 27; so that when the spring 34 is held in the detent 33, the spring 27 cannot turn said plate about its pivot.

In operation, the record support being held against rotation by the brake 26, and a record having been placed on the said support, the index finger 30 is first moved inwardly to cause the spring 34 to snap in

the detent 33 therefor. By this operation the brake 26 is released from the flange 4' and the turntable permitted to rotate. The finger 30 is then adjusted until its inner end is located over the groove or portion of the record at which it is desired that the stylus should be when the brake mechanism is to be automatically applied, this movement or adjustment of the finger causing the rotation of the lever 24 and with it the plate 31 against the action of spring 32. The handle 17 is then operated to lower the stylus on the record and the reproduction of the record ensues. When the stylus reaches the point on the record at which the reproduction is to cease, the finger 20' shifts the releasing-dog 35 to cause the spring 34 to be elevated and the brake lever 24 to be turned by the spring 27, whereupon the rotation of the record support and the record carried thereby are stopped by the engagement of the brake 26 with the flange 4' on the record support.

With this construction the phonograph may be automatically stopped at any desired point in the reproduction of the record. It will be seen that the member 30 serves not only as a means to start the rotation of the record support and the record carried thereby, but also as a means for adjusting or setting the stop mechanism so as to cause the phonograph to be stopped at the desired point in the reproduction of the record.

Various modifications may be made in the specific construction disclosed without departing from the spirit of my invention.

Having now described my invention, what I claim as new and desire to protect by Letters Patent is as follows:

1. The combination with a rotatable member and a second member movable relatively to each other, braking means for said rotatable member, automatic means for effecting the operation of said braking means during the relative movement of said members, and unitary means for rendering said braking means inoperative and for controlling the relative position between said members at which said automatic means is rendered operative, substantially as described.

2. The combination of a rotatable member, a traveling member movable relatively thereto, braking means for said rotatable member, means for holding said braking means in inoperative position, means for automatically releasing said braking means from said holding means during the movement of said traveling member, and unitary means for rendering said holding means operative and for varying the position of said traveling member at which said releasing means is rendered operative, substantially as described.

3. The combination of a rotatable mem-

ber, a traveling member movable relatively thereto, braking means for said rotatable member, latching means for holding said braking means in inoperative position, means for automatically releasing said latching means when said traveling member has reached a predetermined position in its movement, and unitary means for setting said latching means and for controlling the position of said traveling member at which said releasing means is rendered operative, substantially as described.

4. The combination of a rotatable member, a traveling member movable relatively thereto, braking means for said rotatable member pivoted about a given axis for movement into and out of braking position, and automatic means for rendering said braking means operative when said traveling member has reached a predetermined position in its movement, said automatic means comprising a retaining member, a releasing member, and a support for said releasing member on which the latter is movable, said support being adjustable about the axis of said braking means, substantially as described.

5. The combination of a rotatable member, a traveling member movable relatively thereto, braking means for said rotatable member pivoted about a given axis for movement into and out of braking position, means for holding said braking means in inoperative position, said holding means being adjustable about the pivotal axis of said braking means, and means for automatically releasing said braking means from said holding means when said traveling member has reached a predetermined position in its movement, substantially as described.

6. The combination with a rotatable member and a traveling member movable relatively to each other, of braking means for said rotatable member, adjustable means for holding said braking means in inoperative position, yielding means for holding said adjustable means in adjusted position, and automatic means for releasing said braking means from said holding means when said members have reached a predetermined relative position, substantially as described.

7. The combination of a rotatable member, a traveling member movable relatively thereto, braking means for said rotatable member, adjustable means for holding said braking means in inoperative position, friction means for holding said adjustable means in adjusted position, and means for automatically releasing said braking means from said holding means when said traveling member has reached a predetermined position in its movement, substantially as described.

8. The combination with a rotatable member and a second member movable relatively

to each other, of braking means for said rotatable member, means for holding said braking member in inoperative position, means for automatically releasing said braking means from said holding means when the members have reached a predetermined relative position, and unitary means for rendering said holding means operative and for varying the relative position between said members at which said releasing means is rendered operative, substantially as described.

9. The combination with a rotatable member and a second member movable relatively to each other, of braking means for said rotatable member, means for holding said braking means in inoperative position, means including a cam for automatically releasing said braking means from said holding means when said members have reached a predetermined relative position, and unitary means for rendering said holding means operative and for varying the relative position between said members at which said releasing means is rendered operative, substantially as described.

10. The combination with a rotatable member and a second member movable relatively to each other, of braking means for arresting the rotation of said rotatable member, means for holding said braking means in inoperative position, means including a device movable by said second member for automatically releasing said braking means from said holding means when said members have reached a predetermined relative position, and unitary means for rendering said holding means operative and for varying the relative position between said members at which said releasing means is rendered operative, substantially as described.

11. The combination with a rotatable member and a second member movable relatively to each other, of braking means for said rotatable member, means comprising a spring for holding said braking means inoperative, and means including a device movable by said second member and a cam movable by said device for automatically rendering said holding means inoperative when said members have reached a predetermined relative position, substantially as described.

12. The combination with a rotatable member and a second member movable relatively to each other, of braking means for said rotatable member, automatic means for

rendering said braking means operative during the relative movement of said members, and means including an index movable over said rotatable member for rendering said braking means inoperative and for controlling the relative position between said members at which said braking means is rendered operative by said automatic means, substantially as described.

13. The combination with a rotatable member and a traveling member movable relatively to each other, of braking means for arresting the rotation of said rotatable member, automatic means for rendering said braking means operative when said members have reached a predetermined relative position, and means comprising an index connected to said braking means and movable over said rotatable member for rendering said braking means inoperative and for controlling the relative position between said members at which said braking means is rendered operative by said automatic means, substantially as described.

14. The combination with a movable member and a second member movable relatively to each other, of braking means for said movable member, means tending to apply said braking means, adjustable means for automatically rendering said brake applying means operative when said members have reached a predetermined relative position, and yielding means for retaining said adjustable means in adjusted position, said retaining means being immovable by said brake applying means, substantially as described.

15. The combination with a movable member and a second member movable relatively to each other, braking means for said movable member, spring means tending to apply said braking means, adjustable means for automatically rendering said brake applying means operative when said members have reached a predetermined relative position, and spring means for retaining said adjustable means in adjusted position, said second named spring means being stronger than said first named spring means, substantially as described.

This specification signed and witnessed this 24 day of June, 1916.

WALTER H. MILLER.

Witnesses:

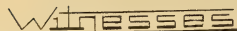
WILLIAM A. HARDY,
J. UNGER.

REPRODUCER FOR PHONOGRAPHS.

1,241,673----- P. S. Sorensen,
Patented ---- Oct. 2, 1917,
Filed July 1, 1916.

1,241,673.

Patented Oct. 2, 1917.



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Inventor
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UNITED STATES PATENT OFFICE.

PETER S. SORESENSEN, OF NORTH MILWAUKEE, WISCONSIN.

REPRODUCER FOR PHONOGRAPHS.

1,241,673.

Specification of Letters Patent.

Patented Oct. 2, 1917.

Application filed July 1, 1916. Serial No. 107,011.

To all whom it may concern:

Be it known that I, PETER S. SORESENSEN, a citizen of the United States, and a resident of the village of North Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Reproducers for Phonographs; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

Among the different kinds of phonographs and talking machines now on the market, are two generally well known types, one designed to use a needle tracing point or stylus to track over a flat disk record and the other adapted to use a jewel for the purpose, and this difference in construction is due to the different character of records used on the two types of machines. The records for use on a machine using a needle point or stylus are provided with a sound wave impression of one character while the records for use on the other type of machine are provided with sound wave impressions of another character. The one acts to set up the sound vibrations through the reproducer by causing a transverse movement of the reproducing point and the other by a substantially vertical or longitudinal movement thereof. In each instance the oscillation of the tracing point is transmitted to a diaphragm whereby the sound is reproduced in accordance with the sound wave impression upon the record.

It is an object therefore of this invention to construct a reproducer which is capable of universal use on either of the types of records mentioned by simple shifting movement of the tracing point, the tracing point in one position being capable of movement to reproduce sounds from one kind of record and in another extreme position of adjustment capable of movement to reproduce sounds from another type of record.

It is also an object of this invention to construct a reproducer for use on talking machines wherein the tracing stylus is pivoted in offset relation with respect to the diaphragm so as to be capable of vibrating or oscillating either transversely or longitudinally dependent upon its angle of adjustment with respect to the diaphragm to permit the same to be used with different

types of records to reproduce sounds therefrom according to the particular sound wave impression on the record.

It is also an object of this invention to construct a reproducer for talking machines capable of universal use upon different types of records, the tracing stylus being susceptible to longitudinal or transverse vibrations according to its position of adjustment.

It is furthermore an important object of this invention to construct a reproducer for use on talking machines which is adjustable into different positions whereby vibrations of different character may be imparted thereto from the sound wave lines of different character on different records used upon the machine.

It is finally an object of this invention to construct an improved type of adjustable reproducer simple in construction and operation and capable of being used on a record having either transverse sound wave lines disposed in the plane of the record or those of constant radius but varying in depth of impression on the record.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Figure 1 is a fragmentary side elevation of a disk record playing machine illustrating the use of a reproducer embodying the principles of my invention thereon.

Fig. 2 is an enlarged side elevation of the sound box mounted on the sounding arm.

Fig. 3 is a top plan view of the sounding arm showing the adjustable connection for supporting the sound box adjustably thereon.

Fig. 4 is a detail section taken on line 4-4 of Fig. 3.

Fig. 5 is a detail section taken on line 5-5 of Fig. 2.

Fig. 6 is a detail section taken on line 6-6 of Fig. 5.

As shown in the drawings:

The reference numeral 1, indicates as a whole a talking or sound reproducing machine having a rotatable table to receive a disk record 2, placed thereon for rotation thereby. A pivoted sounding arm 3, is mounted at one side of the machine 1, and has an extension 4, connected therewith by a universal joint 5. Inserted into the end of the extension arm 4, is a tubular elbow connection comprising a long tubular portion 6, engaged within the end of the ex-

tension 4, and communicating at right angles through a barrel or cylinder 7, rigidly associated therewith. Said barrel or cylindrical portion 7, is provided with an end cap or cover 8, rigidly secured thereon in any suitable manner. Slidably inserted within the barrel 7, is a cylindrical member 9, having a peripheral shoulder or collar 10, which abuts against the open end of the barrel 7. Rigidly secured in the cap 8, of the barrel 7, is a guide screw 11, having a coiled compression spring 12, wound thereabout and bearing upon the integral end wall of the inner cylinder 9. The marginal edge of the open end of the barrel 7, is provided with two recesses or notches therein having the indicative numerals "1" and "2" marked adjacent thereto, and a pin 13, projects from the exterior of the cylindrical member 9, and is adapted to seat in one or the other of said recesses to hold said inner cylinder 9, in one or the other of the two possible positions by rotation within the barrel 9. A disk element 14, is provided having a tubular hub extension 15, adapted to fit over the open end of the cylindrical member 9, secured releasably thereto by a pin or screw 16. A sounding diaphragm 17, is mounted in said disk 14, the assembly affording a sound box, and is adapted to be set in vibration by a bell crank lever, one arm of which is denoted by the reference numeral 18, and bears centrally upon said diaphragm, and the other arm of which is denoted by the reference numeral 19, and projects beneath and to one side of said disk element 14. Said disk element 14, is provided with a pair of lug extensions 20, between and in which is journaled a pivot shaft 21, on which said bell crank 18—19 is mounted.

A set screw 22, is provided in said bell crank 18—19, adapted to be tightened upon the pivot shaft 20, to hold said bell crank securely thereon. The arm 19, of said bell crank is provided with an aperture through the outer end thereof adapted to receive a needle or other tracing point or stylus 23, mounted securely therein to track over the record.

As shown in Fig. 2, a set screw 24, is provided threaded into the arm 19, at the opposite edge to tighten against the stylus or needle to hold the same securely therein.

The operation is as follows:

The two possible adjustments of the tracing stylus with reference to the arm 4, are shown in Fig. 2, one position being shown in dotted lines and the other in full lines. Such adjustments are made by rotating the diaphragm head or disk member 14, such rotation being permitted by pulling outwardly to one side of the arm 4, to withdraw the inner cylinder 9, against the compression of its spring 12, and then rotating

said disk member together with said inner cylinder 9, until the pin 13, of said inner cylinder 9, latches into one or the other of the notches "1" or "2", as the case may be.

With the stylus in one position of adjustment with reference to the tubular sounding arm 4, the tracing point is adapted to track upon one type of a playing record to reproduce sounds therefrom according to the sound wave impression thereon, and when in the other position of adjustment, is adapted to track in another type of wave line impression of another record to reproduce sound therefrom. With the stylus adjusted to the full line position shown in Fig. 2, the same is susceptible of transverse vibrations as it tracks upon the face of the disk record, and when adjusted into the dotted line position shown, is susceptible to vertical vibrations caused by tracking in a wave line impression of another character on another type of disk. The stylus by adjustment, is susceptible to both character of wave line impressions on different disk records due to the offset pivotal mounting of the needle carrying arm whereby the needle carrying arm may pivot upon its pivot shaft to transmit different kinds of vibrations according to its adjustment.

I am aware that various details of construction may be varied through a wide range without departing from the principles of this invention and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A reproducer for phonograph machines capable of use on different types of disk records comprising a diaphragm carrying head, a vibratory arm pivoted thereon, a tracing stylus mounted in said arm, resiliently connected means permitting adjustment of said diaphragm head to change the angle of contact of said stylus with the playing record, and a pin and notch mechanism for retaining said diaphragm head in fixed adjusted positions.

2. In a reproducer of the class described, a rotatable adjustable diaphragm head, means positively latching the same in different positions of adjustment, a vibratory arm pivoted on said head, a diaphragm mounted on said head contacted by said arm, and a tracing stylus mounted in said arm adapted to be shifted on said head to different angular positions with reference to records played.

3. In a reproducer of the class described, a rotatable adjustable diaphragm head, a diaphragm mounted therein, a bell crank vibratory arm pivoted on said head with one arm contacting said diaphragm, a stylus mounted in the other arm of said bell crank, and resilient interlatching means to latch said diaphragm head in different positions

of adjustment to vary the angle of contact of said stylus with a playing record.

4. In a device of the class described the combination with a tubular arm, of a cylindrical extension thereon, a sound box comprising a diaphragm head, a cylindrical member associated therewith and interfitting with said cylindrical member on the arm, a spring coiled within said interfitting cylindrical members to hold the same resiliently associated with one another and permitting rotation or adjustment thereof, and a pin and latch mechanism between said cylindrical members to lock the sound box in different adjusted positions with respect to said cylindrical member on said arm.

5. In a device of the class described, a tubular arm, an integral cylindrical extension thereon, a sound box comprising a diaphragm head, a diaphragm mounted there-

in, a reproducing needle connected with the diaphragm head and with the diaphragm to vibrate the same, a cylindrical member associated with the diaphragm head and interfitting with said cylindrical extension, resilient means affording connection between said cylindrical member and said cylindrical extension permitting rotational adjustments of the diaphragm head, and a pin and slot latching means between said cylindrical member and said cylindrical extension to latch the diaphragm head into different adjusted positions.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

PETER S. SORENSEN.

Witnesses:

CHAS. T. BRICHTA,
P. V. SCHISLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

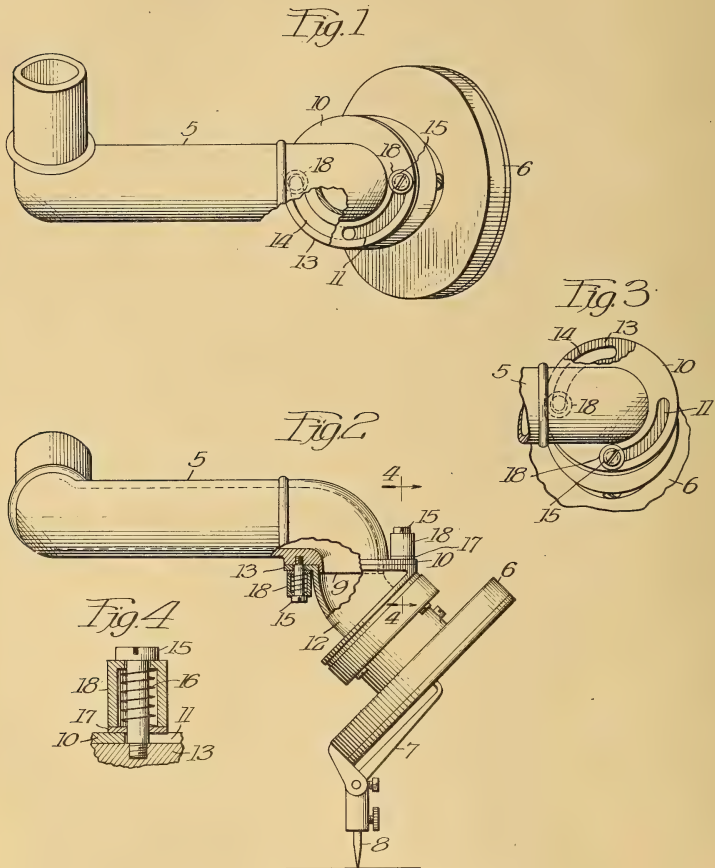
UNIVERSAL REPRODUCER FOR TALKING MACHINES.

1,241,736 ----- A. A. Huseby
Patented ----- Oct. 2, 1917,
Filed ----- May 2, 1917.

A. A. HUSEBY,
UNIVERSAL REPRODUCER FOR TALKING MACHINES.
APPLICATION FILED, MAY 2, 1917.

1,241,736.

Patented Oct. 2, 1917.



WITNESS:

Leonard W. Novander

INVENTOR.
Albert A. Huseby
BY Pond & Wilson
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

UNIVERSAL REPRODUCER FOR TALKING-MACHINES.

1,241,736.

Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed May 2, 1917. Serial No. 165,971.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Universal Reproducers for Talking-Machines, of which the following is a specification.

This invention relates to the art of talking machines and has reference more particularly to improvements in reproducers which are adapted to play records of both the laterally and the vertically cut types. More specifically, the invention relates to that type of such reproducers wherein a single sound box is used, which sound box is coupled to the tone arm with capacity for a swinging movement through an angle of ninety degrees (90°), the sound box in one position being adapted to play records of the laterally cut type and in the other position being adapted to play records of the vertically cut type.

The object of the invention is to provide a simple, inexpensive, easily manipulated and improved reproducer of the class specified.

The invention will be readily understood by those skilled in the art from the following description taken in connection with the accompanying drawing which illustrates one practical and workable embodiment thereof, and in which—

Figure 1 is a top plan view of the swiveled section of the tone arm, the sound box, and the coupling means, showing the sound box in position for playing a laterally cut record.

Fig. 2 is a side elevation partly in section, of Fig. 1.

Fig. 3 is a fragmentary top plan view, broken away, illustrating the other position of the sound box.

Fig. 4 is an enlarged sectional detail on the line 4-4 of Fig. 2.

Referring to the drawing, 5 designates the usual swiveled end section of the tone arm, and 6 a sound box provided with the usual stylus lever 7 and stylus 8. The downwardly turned free end of the tone arm 5 is formed with a hollow boss 9 and with a circular external flange 10 surrounding the boss 9. This flange is formed with an arcuate slot 11. 12 designates a coupling member that forms in effect an extension of the

tone arm, being swiveled on the boss 9 and provided with a circular flange 13 that registers with the flange 10 of the tone arm and is also formed with an arcuate slot 14 similar to the slot 11. At its other end the member 12 is secured to the usual central shank or stem of the sound box by any approved connecting means, the specific form or character of such connecting means not constituting any part of the present invention.

Tapped into each of the flanges, 10 and 13, and extending through the slot of the other flange is a headed stud 15. Surrounding this stud is a coiled compression spring 16 that rests at its lower end on a washer 17 lying next to the slotted portion of the flange. Surrounding the spring is a cage or housing 18, the inner end of which rests on the washer 17 while its upper end is apertured for the passage of the stud and is engaged by the head of the latter, as clearly shown in Figs. 2 and 4. By this means the two flanges, 10 and 13, are held in register, and at the same time are capable of a relative turning movement about their common axis to the extent permitted by the slots of the flanges, which latter are substantially ninety degrees (90°) in extent. The flanges are elastically held together with sufficient friction to secure the box in either playing position. Figs. 1 and 2 show the position for playing laterally cut records such as the Victor and Columbia records. By simply grasping the sound box and turning it through an angle of ninety degrees from the position shown in Figs. 1 and 2, it is brought into correct position for playing vertically cut records such as the Edison and Pathe records.

The described construction can be easily and cheaply manufactured, is reliable and efficient in operation, presents no obstruction to the sound waves passing from the sound box through the tone arm, and is neat and unobtrusive in appearance. While angularly shiftable sound boxes coupled to the tone arm are known, most of them are either too complicated and expensive to be practicable, or yield an inferior tone effect when playing one or the other of the two types of record. My present reproducer plays both records with equal efficiency, and involves no manipulation of the parts in shifting from

one playing position to the other beyond a mere turning of the sound box on its pivotal axis at the free end of the tone arm.

Without limiting myself, therefore, to the 5 precise details shown and described,—

I claim:

1. The combination with a tone arm having a circular flange at one end, and a sound box, of a coupling member forming an extension of the tone arm and secured to the sound box, said coupling member having a circular flange registering with the flange of said tone arm, and means engaging and holding said flanges in register with capacity for a relative turning movement about their common axis.

2. The combination with a tone arm having a circular flange at one end, and a sound box, of a coupling member forming an extension of the tone arm and secured to the sound box, said coupling member having a circular flange registering with the flange of said tone arm, and elastic means engaging and clamping said flanges together but permitting a relative turning movement thereof about their common axis.

3. The combination with a tone arm having a circular flange at one end, and a sound box, of a coupling member forming an extension of the tone arm and secured to the sound box, said coupling member having a circular flange registering with the flange of said tone arm, one of said flanges having an arcuate slot and the other flange carrying a headed stud extending through said slot, and a spring confined between the head of said stud and said slotted flange.

4. The combination with a tone arm having at one end a circular flange provided

with an arcuate slot, and a sound box, of a coupling member forming an extension of the tone arm and secured to the sound box, said coupling member having a circular flange registering with the flange of said tone arm and also provided with an arcuate slot, headed studs carried by said flanges respectively and each extending through the slot of the other flange, and springs confined between the heads of said studs and said flanges.

5. The combination with a tone arm having at one end a circular flange provided with an arcuate slot, and a sound box, of a coupling member forming an extension of the tone arm and secured to the sound box, said coupling member having a circular flange registering with the flange of said tone arm and also provided with an arcuate slot, headed studs carried by said flanges respectively and each extending through the slot of the other flange, springs confined between the heads of said studs and said flanges, and housings surrounding said springs.

6. The combination with a tone arm having a circular flange at one end and a hollow boss projecting beyond the plane of said flange, and a sound box, of a coupling member at one end swiveled on said boss and provided at the same end with a circular flange registering with the flange of said tone arm, and at its other end secured to the sound box, and means engaging and holding said flanges in register with capacity for a relative turning movement about their common axis.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SPEED REGULATOR FOR PHONOGRAPHS.

1,241,887 ----- Patented Oct. 2, 1917.
Filed August 31, 1915.

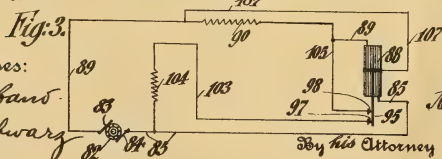
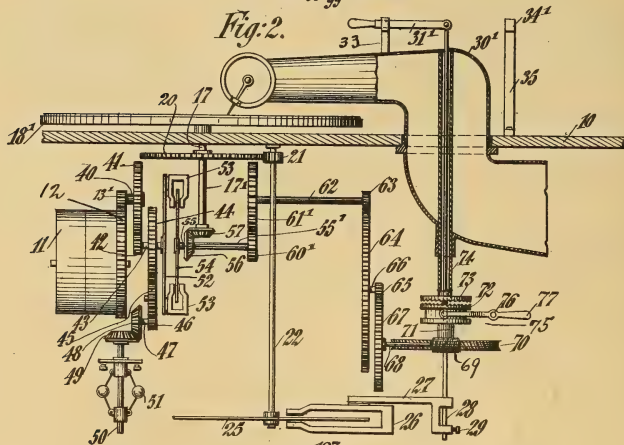
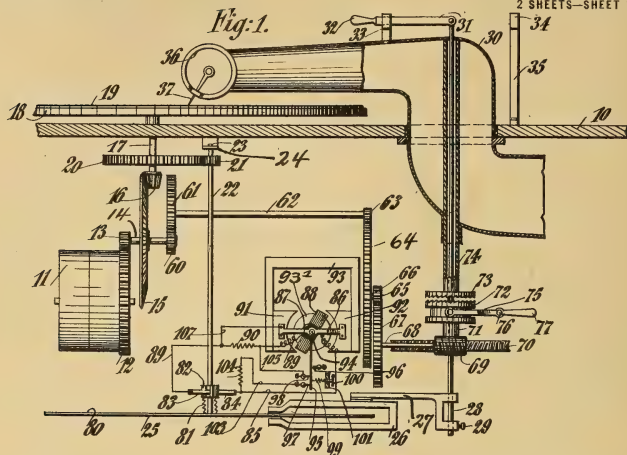
A. Ruckgaber.

A. RUCKGABER.
SPEED REGULATOR FOR PHONOGRAPHS.
APPLICATION FILED AUG. 31, 1915.

1,241,887.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 1.



Witnesses:
Jost Bioband
John Schwarz

Inventor
Albert Ruckgaber
By his Attorney C. P. Boepel.

A. RUCKGABER.
SPEED REGULATOR FOR PHONOGRAPHS.
APPLICATION FILED AUG. 31, 1915.

1,241,887.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 2.

Fig. 4.

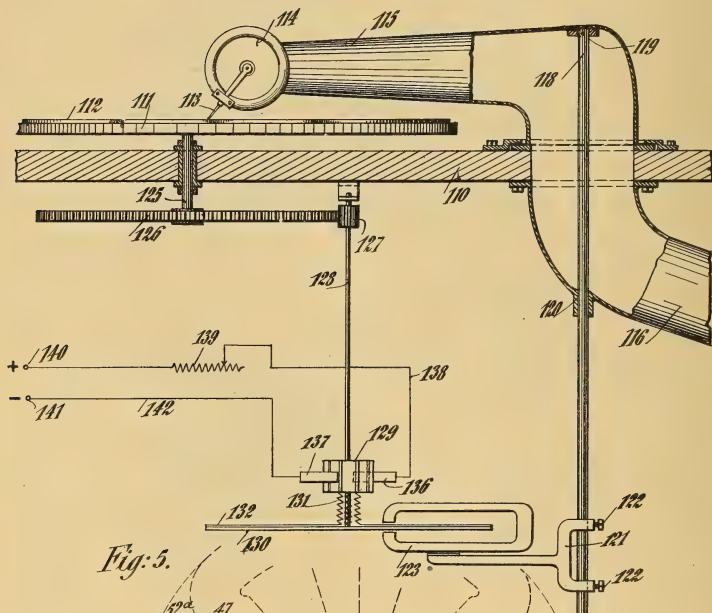
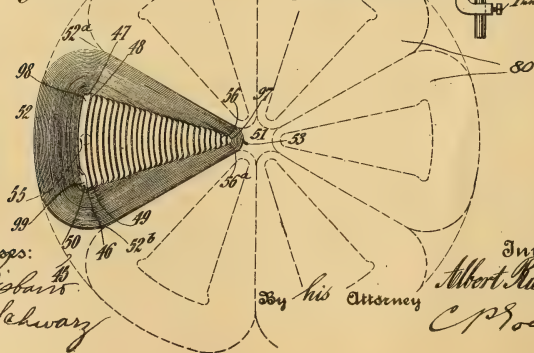


Fig. 5.



Witnesses:
Jost Zisbarr
John Schwarz

Inventor
Albert Ruckgaber
By his Attorney
C. P. Ruckgaber

UNITED STATES PATENT OFFICE.

ALBERT RUCKGABER, OF BROOKLYN, NEW YORK.

SPEED-REGULATOR FOR PHONOGRAPHS.

1,241,887.

Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed August 31, 1915. Serial No. 48,146.

To all whom it may concern:

Be it known that I, ALBERT RUCKGABER, a citizen of the United States, and a resident of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Speed-Regulators for Phonographs, of which the following is a specification.

This invention relates to phonographs and more particularly to improvements therein, the object of which is to provide means for the regulation of the speed of the record disk. More particularly the object of the present invention is to provide improvements over certain structures for which I filed patent applications on March 6, 1914 under Serial No. 822,933 and on August 7, 1914 under Serial No. 855,618.

The invention of this application is shown in the drawings and will be more fully described hereinafter and finally pointed out in the claims.

In the accompanying drawing,

Figure 1 is a side view with parts partly in section and partly in elevation, showing my improvements embodied in a phonograph.

Fig. 2 is also a side view showing parts partly in section and partly in elevation, of a different form of my invention.

Fig. 3 is a diagrammatic view of the electrical connections shown in Fig. 1.

Fig. 4 is a side view showing partly in section and partly in elevation, of still a different embodiment of my invention, and

Fig. 5 is a plan view of one embodiment of the coil used on the disk.

Similar reference numerals indicate corresponding parts throughout the figures of the drawing.

Referring to the drawings and more particularly to Figs. 1 and 2, the phonograph frame 10 has arranged therein in the usual manner the spring motor 11, which is provided with the gear 12 meshing with the pinion 13 on a shaft 14, having secured thereto the gear 15 meshing with the bevel gear 16 on the shaft 17, to which shaft the record disk table 18 supporting the record disk 19 is secured, as clearly shown in Fig. 1. The shaft 17 has a gear 20 meshing with the pinion 21 secured to a vertical shaft 22, and has its upper end 23 in a bearing support 24 and its lower end secured to a rotatable supporting plate or frame 25. This support 25 is embraced by a magnet 26 as

clearly shown in Fig. 1, which magnet is secured to the bracket 27 which in turn is keyed or secured to the vertical shaft 28 by means of the thumb screw or other suitable connection 29. The shaft 28 extends vertically upwardly and passes through the tone-arm 30, and has pivoted at its upper end the lever 31 having the handle 32 which is adapted to engage the locking member 33 secured to the tone-arm 30. This lever 31 is adapted to engage also the locking member 34 on a stationary upright 35. The tone-arm is provided with the sound box 36 of any suitable construction, and this has the stylus 37 of the usual type.

Corresponding parts to those just described are also shown in the embodiment shown in Fig. 2, with the difference, however, that to the pinion 13' is secured the horizontal shaft 40 which has secured thereto the gear 41 which meshes with the pinion 42 on the shaft 43, to which is secured the gear 44. This gear 44 meshes with the gear 45 which acts as an idler, and this idler 45 meshes with the pinion 46 secured to a shaft 47 to which is secured the bevel gear 48 which meshes with the bevel gear 49 secured to the shaft 50. The shaft 50 is provided with a ball governor of the usual type. It is, however, quite clear that the gears 44 and 46 may be so constructed as to have a direct mesh, in which case the idler 45 need not be used. To the shaft 43 to which the gear 44 is secured, there is secured a plate 52 supporting magnets 53 which embrace a metallic disk 54, constituting a magnetic coupling. To the coupling member 54 is secured a small shaft 55 to which is secured the bevel gear 56 which meshes with the bevel gear 57, which corresponds to the bevel gear 16 of Fig. 1, and which is secured to the upright shaft 17', which is like the shaft 17 of Fig. 1, and to which shaft the record disk table 18' is secured, which is like the record disk table in Fig. 1.

In my applications heretofore referred to, the stylus follows freely the groove of the record disk. This method is not used in all cases. Sometimes the stylus and tone arm are moved over the record disk by the operation of suitable mechanism. In this last named case, one revolution of the record disk brings about a movement of the stylus a distance corresponding to the radial distance between two grooves, irrespective

of what the speed of the record disk happens to be. In such cases, if it is desired to relieve the stylus of the work of moving the tone-arm and the control magnet, the tone-arm and magnet are driven by means of driving mechanism so arranged as to keep the stylus exactly over the groove of the record disk at all points and synchronous. Such a mechanism is shown in Fig. 1, and is operated by providing the shaft 14 with a pinion 60 meshing with a gear 61 having secured thereto a shaft 62 to which is secured a pinion 63 meshing in turn with the gear 64 secured to a shaft 66 having a pinion 65, in turn meshing with the gear 67 having secured thereto the shaft 68, to the other end of which a worm 69 is secured, which meshes with the worm gear 70, secured to the sleeve-shaft 71. On the shaft 71 slides one clutch member 72 which is adapted to engage with a fixed clutch member 73, which is fixedly secured to a tube 74 which is secured to the tone-arm 30 and movable therewith. The clutch member 72 is embraced by a yoke 75 pivoted at 76, having a handle 77, which handle enables the clutch member 72 to be raised or lowered into or out of engagement with the clutch member 73. When the clutch member 72 engages the clutch member 73, positive connection is made between the spring motor and the tone-arm by the train of mechanism described, and with each revolution of the record disk the stylus 37 is moved a certain distance corresponding to the space between the grooves. Assuming that the stylus moves inward, that the driving-train speed is correctly computed and that the stylus is placed at the commencement of the outermost groove, then on the rotation of the record disk, the stylus will be moved by the mechanism inward a space corresponding to the distance between the grooves at each revolution of the record disk. Or, in other words, after the stylus is once placed in the groove, the stylus will always track the groove.

The train of mechanism described to connect the spring motor with the tone-arm so as to carry this out, is also clearly shown in Fig. 2, and in this case the shaft 55 has an extension 55¹ having secured thereto a gear 60¹ meshing with a gear 61¹, secured to the shaft 62.

When it is desired to use the stylus and record disk in a manner so that the stylus follows the groove, as in the well-known Victor type, then the yoke 75 is operated by the handle 77 and the clutch member 72 is moved out of engagement with the clutch member 73. When the clutch member 72 is brought out of engagement with the clutch member 73 by means of the handle 77, then the tone-arm can move freely over the record.

When it is desired to use the device for a constant linear velocity, then the lever 31 or the lever 31¹ is brought into the position as shown in Figs. 1 and 2, namely, it locks with the locking member 33, and the magnet moves with the tone-arm. If the clutch members 72 and 73 are brought into engagement with each other, then a direct driving action would exist between the spring motor and the tone-arm. But when it is desired to use a constant speed record, then the lever 31 or the lever 31¹ is moved out of engagement with the locking member 33 and brought into engagement with the stationary locking catch 34 or the catch 34¹. In the latter case, the magnet 26 would be locked in a permanent position. And when it is desired to have the record line drive the stylus, the clutch members 72 and 73 are disengaged from each other.

In order to regulate the speed of the record disk, means are provided which utilize the action of a relay, as clearly shown in Fig. 1, the electrical connection of the relay being shown in a diagrammatic manner in Fig. 3 for greater clearness. In Fig. 5 is shown one embodiment of a coil used on the disk, and for generating an electromotive force. The disk or frame 25, in this case, is provided with a series of coils 80, suitably wound to act as an armature, which have their ends 81 secured to a commutator 82, having brushes 83 and 84 contacting therewith. The brush 84 has secured thereto a conductor 85, which conductor is in electrical contact with the spiral spring 87 which has its end in electrical contact with one end of the winding 88 and the other end of this winding or movable coil 88 is electrically connected with a similar spiral spring which is electrically connected with the end of a conductor 89 which has in series therewith a resistance 90, and which conductor 89 is connected with the brush 83. The winding or movable coil 88 is movable over a fixed iron core 93', arranged between magnet poles 91 and 92 of the magnet 93. These parts are not shown in detail, as they are well known. The winding or coil has secured thereto a shaft 94, and to the shaft is secured a downwardly depending pointer 95, both shaft 94 and pointer 95 being insulated from the winding or coil. The pointer has its movement limited by an adjustable stop 96 at one side, and by adjustable stop contacts 97 and 98 at the other side. The pointer is secured to a spring 99 which has its tension controlled by a thumb screw 100 movable in or supported by a stationary part 101 which may be a suitable part of the frame of the phonograph or an extension thereof. The contact point 97 has secured thereto a conductor 103, which has connected therewith in series a resistance 104 and which conductor 103 is connected with the

conductor 85, which, as stated, is connected with the brush 84. The contact point 98 has secured thereto a conductor 105 which is secured to the conductor 89 which, as before stated, is connected in series with the resistance 90 and which conductor, as stated, connects with the brush 83. The conductor 107 connects the stationary frame 86 with the conductor 89 at a position between the brush 83 and the resistance 90. The frame 86 is in electrical contact with the pointer 95.

In Fig. 3 the conductors and electrical connections just described are shown diagrammatically, and the same reference characters are applied thereto, the relay 88 is shown in Fig. 3 as in vertical position, while in Fig. 1 as in inclined position, but the position of the relay 88 is not material.

The operation underlying these electrical connections is as follows: Referring now to Fig. 1, when the disk or frame 25 with its coil 80 is rotated in respect to the magnetic member 26, an electromotive force is produced. The resulting current flows through the brush 84, conductor 85, coil 88, conductor 89, and resistance 90, and brush 83. In this case, the pointer 95 contacts with the stop 96, and does so until the voltage produced exceeds a certain assumed normal. When, however, the electromotive force increases above this assumed normal, then the coil 88 will be moved, which will move the pointer 95, and this pointer 95 will make contact with the contact points 97 and 98. Then part of the current will flow from the brush 84 through the conductor 85 through the coil 88, conductor 89, not through the resistance 90, but through the conductor 105, past the contact point 98 through the pointer 95, through the stationary bar 86, through the conductor 107, then through the conductor 89 to the brush 83. That is, practically all the current will flow through the pointer in preference to going through the resistance 90. It has been said that part of the current goes through the conductor 85. The other part of the current flowing from the brush 84 passes through the resistance 104 and through the conductor 103, and past the contact point 97 into the pointer 95, then through the pointer 95, past the frame 86, through the conductor 107, conductor 89, and back to the brush 83, of course, again avoiding the resistance 90. The resistance 104 is sufficiently low so that the moment contact between the pointer 95 and the contact points 97 and 98 is made, a comparatively large current is produced which, flowing through the coil 80, produces in conjunction with the magnet 26 a larger drag. This reduces the speed of the coil 80, until the electromotive force and current produced is lowered. The pointer 95 then moves away from the contact points 97 and 98, and by reason of the spring 99 is moved

against the point 96. If the coil 80 again speeds up so as to increase its electromotive force, coil 88 will again be moved, and the pointer 95 will, as before described, make contact with the contact points 97 and 98. Thereupon, a drag will again be produced until the coil 88 returns, and the pointer 95 breaks contact. Throughout, the object is to have the coil 88 assume such a position with reference to the pole faces 91 and 92 of the magnet 93 as to correspond to a definite induced electromotive force in the coil 80, independent of the loss of electromotive force in the coil 80 due to the larger current flowing when the circuit is completed through the resistance 104. However, when the pointer 95 closes with the contacts 97 and 98, then there is a drop in voltage in the windings of the coil 80, and this reduces the current flowing in the movable coil 88. In order to prevent this, the resistance 90 is practically short circuited, thus allowing the same current to flow through the coil 88 as before. The resistance 90 must be adjusted beforehand to permit this to be carried out, so that there is always the same current in the coil 88, for a given induced electromotive force, so that no matter whether the current flows through the resistance 104 or not, the same current must flow through the movable coil 88. The spring 99 is regulated by the thumb-screw 100, and it affords a means for compensating for any variation in the magnetism of the magnet 26 or any means of variation in the electromotive force produced. Thus the stronger the spring 99, the greater the induced electromotive force necessary to move the coil 88 and the pointer 95.

With a given tension in the spring 99, the voltage or electromotive force induced in the coil 80 will cause the relay coil 88 to be in a certain angular position, as for instance, that indicated in Fig. 1. Though the magnet 26 may vary in its position relatively to the support 25 or coil 80, the relay coil 88 will always take the same position for a given induced electromotive force. If this electromotive force increases, then the pointer 95 would make contact with the points 97 and 98. In that case, the larger current will flow through the resistance 104, and operate in the manner described. Now the reaction between the current flowing in the coil 80 and the magnet 26 will, as stated, cause a braking action on the support 25, and will reduce in turn the induced electromotive force in the coil 80. The greater current flowing through the coil 80 will cause a larger braking action, and will thereby bring about a retardation of the speed of the coil 80 and its supporting disk or bracket 25. This braking action results from the current flowing through the coils, and these coils passing through the poles of the magnet 26. This braking action will reduce the speed

of the coil 80 and consequently the electromotive force produced, and thus the coil 88 will move back to its initial position, until the pointer 95 breaks contact with the contact points 97 and 98.

By the electric connections described, the use of friction to control the speed of the record disk, which in some cases is regarded as undesirable, as friction varies from time to time and is affected by dust or other conditions, may be dispensed with. By the means proposed, it is possible and feasible to replace the drag produced by friction, by a drag produced by utilizing the reaction between the current flowing in the winding of the disk armature 80, and the control magnet 26. The present means utilize an auxiliary circuit so as to cause a very much greater current than the normal to flow in the coil 80 for an instant, thus increasing greatly the counter torque of the armature and thus coacting with the magnet 26 to bring about a retardation of the speed. The relay operates by constantly opening and closing the auxiliary circuit, the frequency with which it does this being dependent upon the state of winding of the spring motor 11, and upon the speed of rotation of the record disk. In other words, the relay closes the auxiliary circuit as soon as the linear velocity or induced voltage exceeds a certain per cent. increase above the normal amount, and keeps the auxiliary circuit closed until the linear velocity or induced voltage is reduced a certain per cent. below the normal amount. In this last case, the relay again opens the auxiliary circuit, and then the operation is repeated. By the means thus described, the coil 80 not only is a means of measuring the linear velocity, but also furnishes the energy for acting as a brake for keeping the speed at a predetermined amount. One advantage of this system consists in the fact that only a very small amount of energy is consumed by the relay, and only at intervals is a large amount consumed, and this is supplied by the energy of the spring stored up as energy of rotation of the rotating parts. A further advantage is the high degree of accuracy under which the parts coöperate.

The limits of electromotive force or speed above or below the normal electromotive force or speed will depend upon the sensitiveness of the relay. If the speed is too low, pointer 95 will be drawn against stop 96, and there will be no current flowing through resistance 104. Any excess unbalanced torque of the spring will then accelerate the speed, the energy for this being supplied by the spring.

Assuming the speed of the record as one, with the stylus located at the periphery of the record, then with the stylus at a point

on the record one-fifth of the radius from the center, the speed of the record will be five. In these two cases, the excess unbalanced torque of the spring will do work at the rate of one to five. By excess unbalanced torque, is meant that torque beyond that necessary to operate the parts satisfactorily. The amount of energy required in these two cases for a given per cent. increase or decrease from normal speed in the two cases, will be in proportion to the square of the two speeds, or as one to twenty-five. Therefore, the time to increase the speed from a given per cent. below normal to a given per cent. above normal speed for the two cases will be given by the ratio of the energy required to the rate of work done in each case, or, for the two cases considered, the times will be as one is to five. Therefore, the time to accelerate the speed a given per cent. with the stylus at the periphery of the record and with the stylus one-fifth of the distance from the center, will be as one to five, or in other words, as far as the acceleration of the speed is concerned, the pointer will open and close the auxiliary circuit five times as fast when the stylus is at the periphery as with the stylus one-fifth of the distance from the center.

In the case of the retardation, when pointer 95 makes contact with points 97 and 98, the rate of work done in driving the current through the resistance 104, will be the same for the two cases considered above. Therefore, disregarding the effect of the excess unbalanced torque of the spring acting against the retardation produced by the current flowing in resistance 104, which will be small, the time to retard the speed a given per cent. with the stylus at the periphery of the record and with the stylus one-fifth of the distance from the center, will be as one to twenty-five. However, as the retardation will be rapid as compared to the acceleration, the rate at which the pointer opens and closes the auxiliary circuit will be only slightly greater than five times as fast with the stylus at the periphery as with the stylus at one-fifth of the distance from the center.

The relay would operate, therefore, as follows: With the spring 11 wound up, and the magnet at the periphery of the coil 80, and the record revolving at say, fifteen revolutions per minute, the pointer opens and closes the auxiliary circuit comparatively quickly. As the stylus moves inward, the action of the pointer would gradually be retarded until at a speed of the record of seventy-five revolutions per minute the relay closes the circuit only one-fifth as often as at the beginning, assuming the spring fully wound. If the spring is just sufficiently wound to operate the mechanism satisfac-

torily, the pointer need not theoretically close the auxiliary circuit at all, whether the stylus is at the periphery or at the center.

Assuming the record disk 19 to rotate, and the stylus 37 to be in position, with the spring 11 wound up to operate the train of mechanism coacting therewith, the device shown in Fig. 1 may be used in various different ways. If it is desired to use the same as a constant speed machine, then and in that case the locking member 31 is swung over to the holder 34 and the tone-arm 30 is free to move. At the same time the clutch members 72 and 73 may take the position as shown in Fig. 1, namely, in disengaged position, and the record line will drive the stylus. Similarly, in Fig. 2, when the locking member 31' is swung over the stationary holder and the clutch is in disengaged position, as shown in Fig. 2, the device causes the record disk to rotate at constant speed, and the stylus follows the record groove. If, however, it is desired to have the tone-arm 30 positively move the stylus over the record disk 19, the clutch members 72 and 73 are brought into engaging position. In this event, the machine may be used either as a constant speed machine by having the locking member in engagement with the member 34, or the machine may be used as a constant linear velocity machine by swinging the locking member 31 into the position shown in Fig. 1.

When the pointer 95 is moved into contact with the contacts 97 and 98, the operation hereinabove described takes place, until the induced electromotive force again reaches a little below normal so as to permit the pointer to be swung back to its initial position against the stop 96 by virtue of the action of the spring 99. The swinging of the pointer from its position against the stop 96 to its position against the contacts 97 and 98 takes place when the induced electromotive force is increased above the normal, and its return swing takes place when the induced electromotive force is again a little below the normal. Thus any tendency to increase the speed of the coil 80 resulting from the unbalanced excess torque of the spring 11, such as to change the electromotive force induced by the coöperation of the coil 80 with the magnet 26, will bring the speed back to a speed a little below the normal. Any increase of speed of the coil 80 will cause the drag to take place and this brings the speed back again to a little below normal. This variation or fluctuation of the speed a little above normal and a little below normal, within narrow limits, brings about a general average, which is, of course, the normal speed. This variation above or below the normal, within these very narrow limits, is considerably less than similar va-

riations above or below the normal obtained in the use of the ordinary ball governor, as applied to the ordinary phonograph.

The result of this control, and the coöperation of the relay with its electrical connections described, brings about a substantially constant linear velocity of the record line with respect to the stylus.

If it is desired to use the phonograph as a constant speed machine, which may be done as before stated, the lever 31 is thrown into the stationary member 34, and permits thereby the tone-arm 30 with its stylus to move over the record disk independently of the magnet 26, which now becomes locked in position by reason of the lever 31 engaging the locking support 34. In this case the relay with its electrical connections acts in the same way as hereinbefore described. In this case, with the record disk rotating at a constant speed, any unbalanced excess torque will tend to increase the speed of the record disk. This tendency to increase the speed would cause a larger induced electromotive force to be created, by reason of the coöperation of the coil 80 with the magnet 26, which magnet 26 is now stationary. But this induced electromotive force will move the coil 88 and hence move the pointer 95 into contact position with the parts 97 and 98, and will bring about an action as described hereinbefore, so that with any tendency to change the speed of the support 25 with its coil 80, for any position of the stylus on the record disk, the induced electromotive force will cause a coöperation of the windings 88, and the electrical connections, until the speed is again brought down somewhat below the normal, and the fluctuations above and below the normal within very narrow limits will again take place, so that the average or normal speed produced will be maintained for all positions of the stylus.

In Fig. 4 is shown a portion of a phonograph operated by means of electric power, and utilizing the armature and magnet as a motor for use on constant linear velocity records. The frame 110 of the phonograph supports the record disk table 111 on which the record disk 112 is suitably placed, and which record disk is engaged by the stylus 113 of the sound box 114 on the tone arm 115 which communicates with the horn 116. The tone arm has secured thereto the vertical rod 118 by means of the key pin 119. This vertical rod 118 passes through the horn 116 at 120 and has its lower end secured to a bracket 121 by means of screws 122. The bracket 121 supports and has secured thereto a permanent magnet 123, which moves with the tone arm 115. The rotatable table 111 has secured thereto the shaft 125, to which in turn is secured the

gear wheel 126 meshing with a pinion 127 through which the shaft 128 passes, and on which shaft 128 the commutator 129 is secured. The rotatable plate or disk or frame 130, which passes between the jaws of the permanent magnet 123 is also secured to the shaft 128. Suitable wires 131 connect the commutator 129 with the armature 132, the armature 132 having its wires wound into suitable coils in a manner similar to the windings shown in Fig. 5, and more particularly shown in my previous patent application Serial No. 855,618, filed August 7th, 1914, patented January 16th, 1917, No. 1,212,693. The commutator 129 is electrically connected with the brushes 136 and 137, the brush 136 being connected with the conductor 138 which in turn contacts with a variable resistance 139 which is in series with the terminal 140. The other terminal 141 is connected with the electrical conductor 142 which is connected with the brush 137.

The impressed electromotive force enters at the terminals 140 and 141 and the commutator 129 has its brushes 136 and 137, together with the coil 132 and permanent magnet 123, act as a motor, and thereby the shaft 128 is rotated, so that the coacting train of mechanism rotates the record disk 112. As the stylus 113 moves inwardly or outwardly, the shaft 118 is moved correspondingly and the permanent magnet 123 moves therewith. This permanent magnet 123 may be replaced by an electromagnet connected in series or shunt with the armature.

In certain cases the frame 130 is provided with cut-out portions of such a shape that the current flowing into the armature is a constant for a constant electromotive force impressed on the motor terminals. The varying elements that need to be balanced in order to maintain the current constant, are the windings and friction of the moving parts for various speeds, the friction of the brushes on the commutator for various speeds and the possible variations in the electrical loss in the brushes, due to the various speeds. Theoretically, the stylus, for a constant linear velocity phonograph, will take a constant power to drag it over the record disk, as the product of torque-arm and speed is a constant. Hence all the above losses can be balanced by suitably cutting out portions of the disk, so that for each position of the stylus on the record disk, with a constant linear velocity, there will be a certain constant friction and eddy current loss, thus requiring a constant power to overcome the losses in the phonograph. The necessary torque will vary inversely as the speed, but the product of the two, or the power, is constant. Therefore, for a given constant impressed voltage at

the motor terminals, there will be a constant drop in voltage, due to a constant current flowing and a constant armature resistance, thus leaving a constant counter electromotive force or induced voltage, and therefore a constant relative linear velocity of record line and stylus. If stable conditions of operation have been obtained at one position of the stylus on the record, moving the stylus inward to a new position will momentarily reduce the counter electromotive force, thus allowing a greater current to flow, which will cause the disk armature to speed up, until the former counter electromotive force is reached, when the current will be the same as before, and hence the linear velocity will be as before. And on the other hand, moving the stylus outward will increase the counter electromotive force, and reduce the current flowing, thus causing the speed to be reduced.

By arranging the resistance in series with the motor adjustable, the linear velocity of the record line and stylus can be adjusted to the proper amount.

This method of operation may, of course, be styled empirical, in that the cut-out portions of the disk must probably be adjusted or changed for each machine.

I have described several embodiments of my invention, but it is clear that changes may be made therein without departing from the spirit thereof as defined in the appended claims.

I claim:—

1. In a phonograph, the combination of a record medium, a medium coacting therewith and movable thereon, means for moving the record medium, means operated by said last-named means for positively moving the coacting medium, members magnetically coacting with each other, means for changing the action of one of said magnetically coacting members upon the other, upon the change of position of the said coacting medium on the record medium, and means capable of changing the relative linear velocity of the record medium and coacting medium at their coacting point on the change of action of one of the magnetically coacting members with the other.
2. In a phonograph, the combination of a record medium, a medium coacting therewith and movable thereon, means for moving the record medium, means operated by said last-named means for positively moving the coacting medium, members magnetically coacting with each other, means for changing the action of one of said magnetically coacting members upon the other, upon the change of position of the said coacting medium on the record medium, means capable of changing the relative linear velocity of the record medium and said coacting medium at their coacting

point, on the change of action of one of the magnetically coacting members with the other, means on one of said magnetically coacting members for inducing therein electric energy, and means operated by said electric energy for maintaining the relative linear velocity of the record medium and coacting medium at their coacting point, substantially constant.

3. In a phonograph, the combination of a record medium, a medium coacting therewith and movable thereon, means for moving the record medium, means operated by said last-named means for positively moving the coacting medium, members magnetically coacting with each other, means for changing the action of one of said magnetically coacting members upon the other upon the change of position of the said coacting medium on the record medium, means capable of changing the relative linear velocity of the record medium and said coacting medium at their coacting point, on the change of action of one of the magnetically coacting members with the other, means on one of said magnetically coacting members for inducing therein electromotive force, and means operated by the resulting electric energy for maintaining the induced electromotive force approximately constant.

4. In a phonograph, the combination of a record medium, a medium coacting therewith and movable thereon, members magnetically coacting with each other, means for changing the action of one of said magnetically coacting members upon the other, upon the change of position of the said coacting medium on the record medium, means capable of changing the linear velocity of the record medium relatively to the said coacting medium, on the change of action of one of the magnetically coacting members with the other, means on one of said magnetically coacting members for inducing an electromotive force, and a relay in circuit with said last-named means for maintaining the induced electromotive force approximately constant.

5. In a phonograph, the combination of a record medium, a medium coacting therewith, means for moving the record medium, members magnetically coacting with each other, one of said members being moved by

the means for moving the record medium, means on one of said members for inducing therein an electromotive force, a relay in circuit with the inducing means, and electric energy absorption means operated by the relay.

6. In a phonograph, the combination of a record medium, a medium coacting therewith, members magnetically coacting with each other, electric energy conducting means on one of said members, means for supplying electrical energy to said last-named means, means connecting one of said members with the record medium for moving the record medium on the movement of one of said members, means operated by said last-named means for positively moving the coacting medium in respect to the record medium, and means connecting the other member with the coacting medium for moving the said member on the movement of the coacting medium.

7. In a phonograph, having a record medium, and a medium coacting therewith, and members magnetically coacting with each other and comprising two elements of an electric motor, one of said members being movable with respect to the other, so that a constant induced electromotive force in one of the said members results in a constant linear velocity of the coacting medium with respect to the record medium at their coacting point.

8. In a phonograph having a record medium and a medium coacting therewith, and members magnetically coacting with each other and comprising two elements of an electric motor, one of said members driving one of said mediums and the other member movable with respect to the first said member, so that the linear velocity of the two members with respect to each other, at their coacting point, bears a constant relationship to the linear velocity of the record medium and the coacting medium relatively to each other at their coacting point.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ALBERT RUCKGABER.

Witnesses:

JOS. BISBANO,
JOHN SCHWARZ.

SOUND PRODUCING APPARATUS.

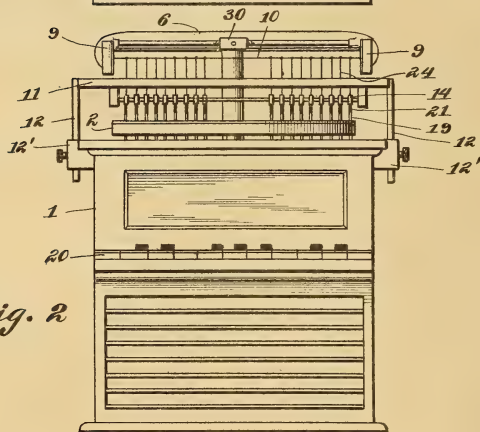
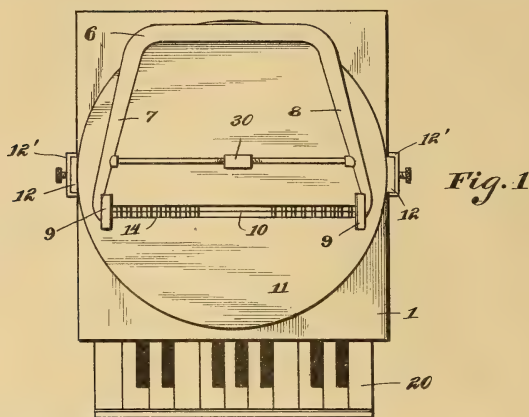
1,241,956 ----- C. S. Gerlach.
Patented ---- Oct. 2, 1917,
Filed ----- July 5, 1916.

C. S. GERLACH.
SOUND PRODUCING APPARATUS.
APPLICATION FILED JULY 5, 1916.

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4 SHEETS—SHEET 1.



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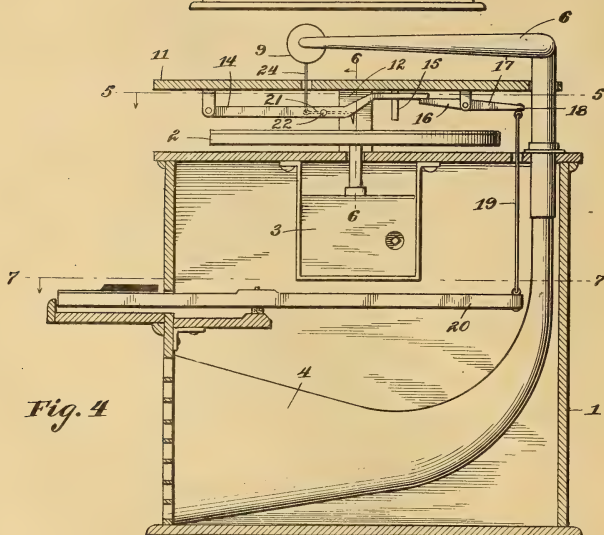
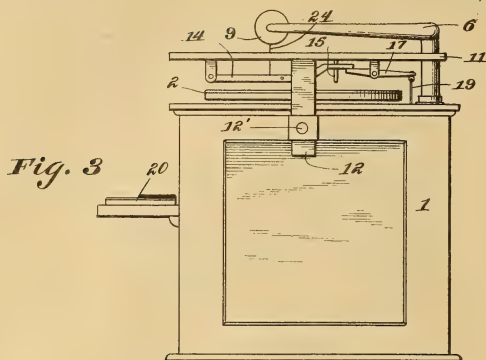
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4 SHEETS—SHEET 3.

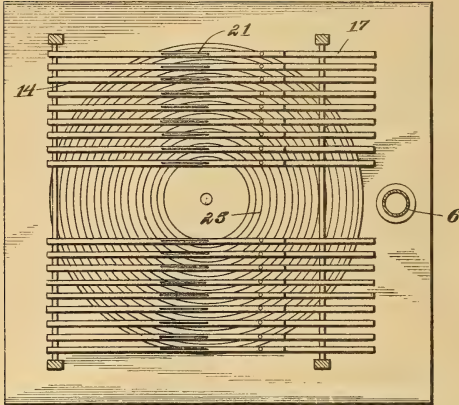


Fig. 5

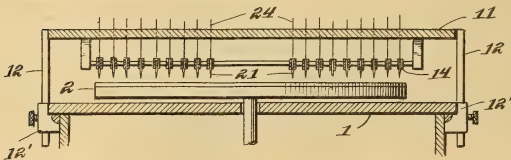


Fig. 6

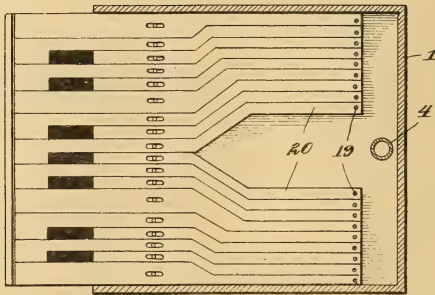


Fig. 7

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4 SHEETS—SHEET 4.

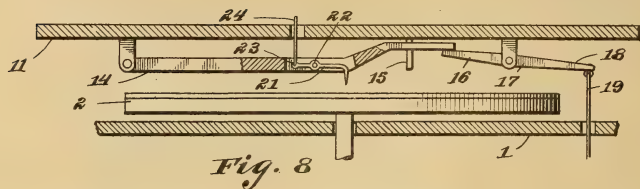


Fig. 8

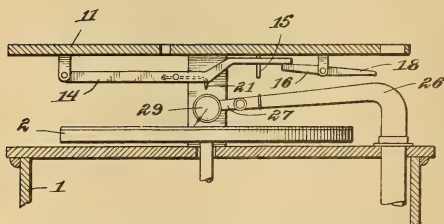


Fig. 10

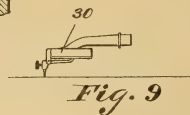


Fig. 9

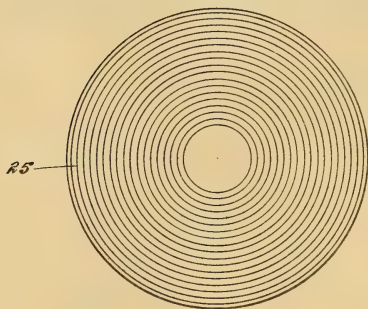


Fig. 11

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UNITED STATES PATENT OFFICE.

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SOUND-PRODUCING APPARATUS.

1,241,956.

Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed July 5, 1916. Serial No. 107,636.

To all whom it may concern:

Be it known that I, CHRISTIAN S. GERLACH, a citizen of the United States, residing at Brandon, in the county of Fond du Lac and State of Wisconsin, have invented new and useful Improvements in Sound-Producing Apparatus, of which the following is a specification.

This invention relates to a sound producing apparatus and has for its primary object to generate a plurality of sound waves of different characteristics such as would be necessary in the moving picture art.

An object of the invention is to provide suitable mechanism by means of which sound waves of different characteristics may be taken from a sound record.

Another object of the invention is the novel manner of moving singularly or collectively a plurality of stylus arms into engagement with sound lines of a record.

Besides the above my invention is distinguished in the novel manner of associating the parts so that the apparatus may be used as an ordinary talking machine or to create sound waves under manual control.

With these and other objects in view the invention will be better understood from the following detailed description taken in connection with the accompanying drawings, wherein,

Figure 1 is a front elevation of the apparatus.

Fig. 2 is a top plan view thereof.

Fig. 3 is a side elevation.

Fig. 4 is a vertical sectional view.

Fig. 5 is a horizontal sectional view on the line 5-5 of Fig. 4.

Fig. 6 is a sectional view on the line 6-6 of Fig. 4.

Fig. 7 is a transverse sectional view of the cabinet on plane of line 7-7 of Fig. 4.

Fig. 8 is an enlarged view of the operating mechanism for one of the stylus arms.

Fig. 9 is a detail view of a part to be hereinafter described.

Fig. 10 is a vertical sectional view of the cabinet showing the parts associated with a plain ordinary record, and

Fig. 11 is a plan view of the improved form of sound records.

Referring to the drawings the numeral 1 designates the casing of the apparatus supporting within, the ordinary turn table 2 and motor 3 of a talking machine. The horn 4 of the talking machine is held sta-

tionary and has a sliding connection with the tone arm 6 having spaced branches 7 and 8. To the free end of each branch is secured a reproducer 9. The centers of the reproducers are arranged in alignment with each other and connected to the ends of the flexible element 10. Slidably mounted directly above the turn table 2 is a frame 11 including standards 12 slidably mounted in tubular uprights 12' supported by the casing 1.

Supported by the frame is a plurality of pivoted levers 14 one for each sound of a certain characteristic that is to be produced. The pivot of the lever 14 is arranged adjacent one end while the opposite end moves in a guide 15 and continuously bears upon one arm 16 of a centrally pivoted lever 17, the other arm 18 of which being acted upon by a rod 19 that in turn is actuated by a member 20 in the form of and having the action of an ordinary piano key. From this latter arrangement it will be seen that each time a member 20 is depressed, the lever 14 will be free to move about its pivot. A stylus arm 21 has a central portion pivoted to an intermediate portion of the lever 14 by a pin 22. One end of the stylus arm is formed into an eye 23 having a connection with one end of a flexible element 24, the other end of which is connected to the flexible element 10 at a point in the length of the latter. As far as I have proceeded it will be seen that when the member 20 is depressed, movement will be given to the lever 14 for bodily moving the stylus arm toward and away from the sound lines of the record upon the turn table. As the stylus arm vibrates due to the sound lines of the record, the element 10 will be set into vibration through the action of the element 24 with the result that both of the vibratory members of the reproducers 9 are given a vibratory motion identical to that of the stylus arm.

I have found out in practice when using my apparatus that it is advisable to construct a special record as illustrated in Fig. 11 of the drawings. This record has a number of concentrically arranged sound lines each of a different sound characteristic, that is to say, the first line may produce the sound of a drum, the second that of a horse trotting and the others varying accordingly depending entirely upon the result sought.

In the drawings I have illustrated my invention so constructed as to be capable of

being converted into an ordinary talking machine for playing ordinary records. To accomplish this the frame 11 is elevated high enough to place the tone arm 6 a predetermined distance above the horn 4, after which the tone arm 26 is substituted. Rotatably mounted in the tone arm 26 at different times is a reproducing device 27 composed of a reproducer 29 constructed to accommodate lateral sound waves of a record and a reproducer 30' to accommodate vertical sound waves.

To take care of expansion and contraction of the element 10, I provide the turn buckle 30 that may have a rigid connection with the branches of the tone arm or may be connected directly to the frame of the reproducers.

It is to be understood that while all of the several features of my improved apparatus have special coöperation with one another and together constitute a particularly effective mechanism for the purpose in view, certain of these features may be applied in other relations and I therefore desire to cover the combination present in the several parts of my improved apparatus whether employed in the general organization shown or elsewhere.

It is further to be understood that the structural embodiment of the invention as a whole and its various features as shown is merely illustrative and not restrictive, since I am well aware that many of the details of construction can be widely varied without departing from the spirit of the invention. I therefore do not desire to be limited in these particulars or in any others except as set forth in the appended claims.

What I claim is:—

1. A sound producing apparatus comprising in combination with a talking machine having a flat turn table, a tensioned element connected to the vibratory member of the reproducer of the talking machine, a record formed with a number of concentric sound lines, means normally out of engagement with and mounted to move into engagement with the sound lines for transmitting vibratory motion from the record to said element, and means for elevating the first mentioned means a considerable distance above the turn table.

2. A sound producing apparatus comprising in combination with a talking machine, a tensioned element connected to the vibratory member of the reproducer of the talking machine, a record formed with a plurality of concentrically arranged sound lines, a plurality of stylus arms equal in number to and adapted to engage the sound lines, a frame on which said stylus arms

are mounted, means for holding the stylus arms from engagement with the sound lines, and means for elevating said frame a considerable distance above the table.

3. A sound producing apparatus comprising in combination with a talking machine having two spaced reproducers, a flexible element connecting the vibratory members of the reproducers together, means for varying the tension of said element, and a plurality of devices each capable of transmitting vibratory motion from a record to said element.

4. A sound producing apparatus comprising in combination with a talking machine having two spaced reproducers, a flexible element connecting the vibratory members of the reproducers together, means for varying the tension of said element, a plurality of devices for independently transmitting vibratory motion from a record to a point in the length of said element, and manually controlled means for moving said devices singularly or collectively into an operative position.

5. A sound producing apparatus comprising in combination with the turn table of a talking machine a frame mounted for sliding movement above said turn table, a plurality of stylus arms carried thereby and adapted when in one position of the frame to be disposed in close proximity to the lines of a record upon said turn table, a tone arm supporting a pair of reproducers, a flexible element connecting the vibratory members of the reproducers together, other flexible elements connected at spaced points to said first element and also connected to said arms, and means for moving said arms singularly or collectively into engagement with the sound lines of the record.

6. A sound producing apparatus comprising in combination with the turn table of a talking machine, a frame mounted for sliding movement above said turn table, a plurality of stylus arms carried thereby and adapted when in one position of the frame to be disposed in close proximity to the sound lines of a record upon said turn table, a tone arm supporting a pair of reproducers, a flexible element connecting the vibratory members of the reproducers together, other flexible elements connected at spaced points to said first element and also connected to said arms, means including members in the form of piano keys for moving said arms singularly or collectively into engagement with the sound lines of the record, and a stationary horn having a sliding connection with said tone arm.

In testimony whereof I affix my signature.

CHRISTIAN S. GERLACH.

PHONOGRAPH AND THE LIKE.

1,842,155 ----- J. H. Dickinson,
Patented Oct. 9, 1917,
Filed Feb. 10, 1916.

J. H. DICKINSON.
 PHONOGRAPH AND THE LIKE.
 APPLICATION FILED FEB. 10, 1916.

1,242,155.

Patented Oct. 9, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

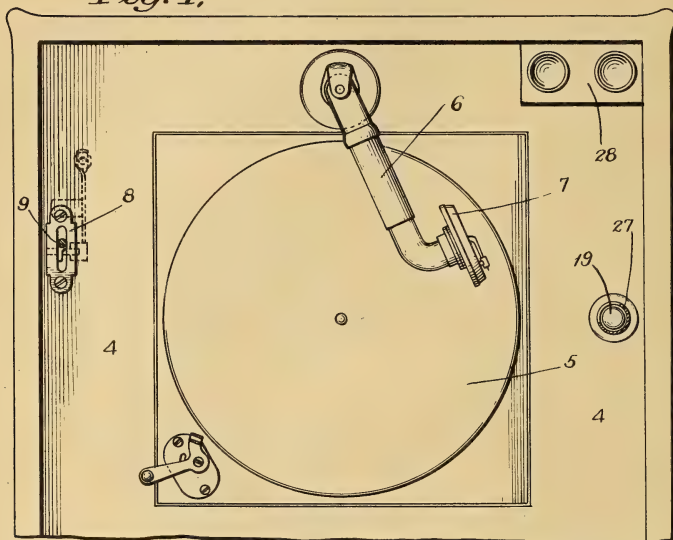


Fig. 3.

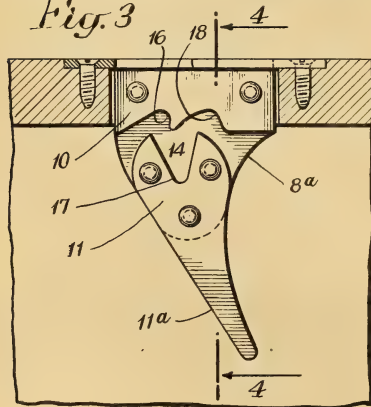
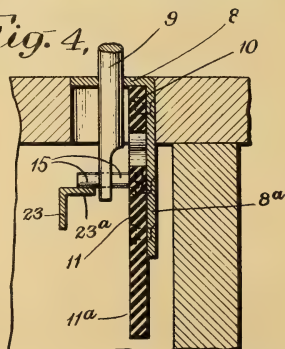


Fig. 4.



INVENTOR
Joseph H. Dickinson
 BY *E. Scherr*
 ATTORNEY

J. H. DICKINSON.
 PHONOGRAPH AND THE LIKE.
 APPLICATION FILED FEB. 10, 1916.

1,242,155.

Patented Oct. 9, 1917.

2 SHEETS—SHEET 2.

Fig. 2.

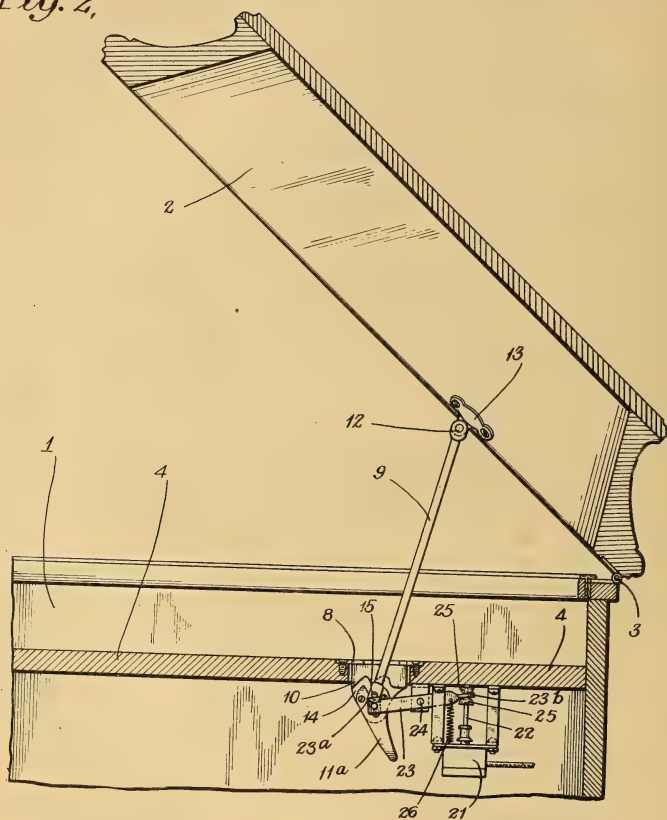
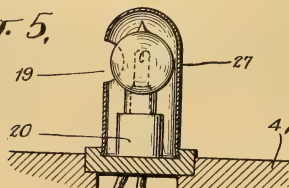


Fig. 5.



INVENTOR
 Joseph Hunter Dickinson
 BY *Edw. J. [Signature]*
 ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH HUNTER DICKINSON, OF CRANFORD, NEW JERSEY, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

PHONOGRAPH AND THE LIKE.

1,242,155.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed February 10, 1916. Serial No. 77,444.

To all whom it may concern:

Be it known that I, JOSEPH HUNTER DICKINSON, a citizen of the United States, residing at Cranford, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Phonographs and the like, of which the following is a specification.

My present invention relates to improvements in phonographs and the like and more particularly relates to means for automatically controlling the lighting of the record playing compartment of the cabinet from the opening and closing of the lid. The advantages of this and other improvements forming the subject of my present invention will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings.

In the drawings, Figure 1 is a fragmentary plan view of the record-playing compartment of a phonograph cabinet embodying my improvements, the lid not being shown. (In Fig. 1 the top of the figure is the back of the cabinet to which the lid is hinged; whereas the front of the cabinet is broken away.) Fig. 2 is a front to back vertical section through the left hand portion of the cabinet of Fig. 1 looking toward the left. The lid of the cabinet is shown in this view propped up in its open position. Fig. 3 is an enlarged detail of a portion of Fig. 2; Fig. 4 is a vertical section on the line 4-4 in Fig. 3 looking in the direction of the arrows; and Fig. 5 is an enlarged vertical sectional view of the lamp, light shield and reflector shown also at the right in Fig. 1, partly in horizontal section and plan.

Describing now the specific embodiment of my invention shown in the drawings:—1 is the body portion of the phonograph cabinet; 2 its lid hinged to the body at 3. (Fig. 2). 4 is the board or deck forming the bottom of the record playing compartment wherein are located the record-supporting turn-table 5, the tone-arm 6 and sound-box 7. At the left (see Fig. 1) this board has an opening through it covered by a slotted plate 8 (compare Fig. 2) through which works the lid-top 9. The plate 8 has a side portion 8^a (compare Fig. 4) bent downwardly therefrom to which two parts

10 and 11 are screwed or riveted, these parts being preferably made of wood, fiber, hard rubber or other noise-deadening material when operated against or struck by the lower end of the prop 9 as will hereafter appear.

The upper end of the prop 9 is pivoted at 12 to a bracket 13 secured to the inside of the hollow lid 2,—see Fig. 2. The parts 10 and 11 are spaced apart and so shaped as to provide an irregularly shaped passage 14 between them,—see Figs. 2 and 3. The lower end of the prop 9 (Figs. 2 and 4) has a transverse pin 15 therein which passes through said passage 14 in the operation of the prop. Thus as the lid 2 is raised, the prop 9 of course lifts with it and its pin 15 follows up the inclined side 11^a of the part 11 which guides it into the mouth—or front-end (Figs. 2 and 3) of the passage 14. Continued lifting of the lid and prop, carries the pin 15 up into the passage 14 until it strikes against the depending projection 16 (Fig. 3) on the part 10. This notifies the operator that the lid has been fully raised. Upon releasing the lid, it drops slightly carrying the pin down into the notch or fork 17 (Fig. 3) of the part 11 which thereupon supports the prop and lid in raised position. To lower and close the lid, the operator first lifts it slightly and then lowers it into shut position. The first or lifting step carries the pin 15 upwardly out of the fork and rearwardly until it strikes against the projection 18 (Fig. 3); and the second or lowering step carries the pin downwardly out of the rear or delivery-end of the passage 14 and thence downwardly within the cabinet to the full extent to permit the shutting of the lid. On reopening the lid, the pin 15 follows through the same cycle just described, first following up the incline 11^a and so on. The purpose of the inclined tail-piece 11^a is to compel the pin to traverse the passage 14 as described instead of in the reverse direction.

This completes the description of the lid-prop illustrated but it will be understood that this specific form of the prop is not essential to my invention. Proceeding now with the description of my invention:—19 is an electric-light bulb in a socket mounted on the deck 4 (compare Fig. 5) at

the right side in Fig. 1. This socket is wired to the source of current supply (not shown) through an electric-switch 21 mounted under the deck 4 in position to be operated by the lid-prop. The switch may be of any suitable type. 22 is its operating plunger. 23 (Fig. 2) is a lever centrally pivotally supported at 24 from the deck 4. The illustrated lever 23 consists of a metal strip having a laterally extending lug 23^a underlying one end of the prop-pin 15 when supporting the lid in elevated position by resting in the fork 17 (Fig. 3) as in Fig. 2. The opposite end 23^b (Fig. 2) of the strip 23 is twisted into a horizontal plane and provided with a hole through which the plunger 22 projects. The plunger is there screw-threaded and a pair of hemispherical nuts 25—25 engage these threads on opposite sides of the end 23^b of the lever and form a pivotal (yet adjustable) operating connection between said lever and the plunger of the switch. The arrangement is such that when the lid is in its propped-open position of Fig. 2, said prop not only supports the lid but also bears down on the lever 23 and pulls out the plunger of the switch which then connects the lamp 19 with the current-source. Thus raising the lid into propped-position automatically lights the lamp. On the other hand the act of releasing the prop to lower the lid, automatically extinguishes the light long before the lid is closed, so that the operator has the satisfaction of knowing that the light is out and is not indefinitely consuming current while the lid is closed. Thus 26 is a spiral spring connected under tension to the lever 23 so as to force the switch-plunger 22 in the direction of cutting off the current the moment the prop-pin 15 is lifted off the lug 23^a (Fig. 4 and Fig. 2) of the lever 23 as described.

Finally it will be noted that a combined eye-protector and reflector 27 is provided in connection with the electric lamp 19 shown as consisting of a preferably metal tube with bright reflecting interior having its upper end closed so that the light cannot shine up directly into the eyes of the operator leaning over the record-playing compartment of the instrument. A horizontally elongated portion is removed from the side of the tube sufficient to throw the light simultaneously on the sound-box in its record-playing positions as well as on the needle-tray or receptacles 28. This directs the light first where it is wanted—either to get a new needle, or to apply it to the sound-box, or to adjust the latter to the beginning of the record-groove, or to the end thereof as a preliminary to the setting of an automatic stop.

Further the reflector is preferably rota-

tably adjustable about its vertical axis to permit the desired lateral adjustment of the beam of light.

What I claim is:—

1. In combination, a phonograph cabinet having an interior deck and a movably connected lid, a prop for said lid connected to the same to move therewith, electric light means for lighting the interior of said cabinet, and means located below said deck and operated by the movement of said prop into lid-supporting position to automatically switch on the light-means.

2. In combination, a phonograph cabinet having an interior deck and a movably connected lid, a prop for said lid connected to the same to move therewith, electric light means for lighting the interior of said cabinet, and means located below said deck and operated by the movement of said prop into lid-supporting position to automatically switch on the light-means and otherwise to switch it off.

3. In combination, a phonograph cabinet having an interior deck and a movably connected lid, a prop for said lid connected to the same to move therewith, electric light means for lighting the interior of said cabinet, and a switch located beneath said deck for connecting and disconnecting the light-means to and from the current, said switch being normally in disconnecting condition, and being shifted into connecting condition by the movement of the prop into lid-supporting position.

4. In combination, a phonograph cabinet having an interior deck and a movably connected lid, a prop for said lid connected to the same to move therewith, electric light means for lighting the interior of said cabinet, a switch located beneath said deck for connecting and disconnecting the light-means to and from the current, and means connected with said switch and caused to be pressed in one direction to operate the switch, by the movement of said prop into lid-supporting position.

5. In combination, a phonograph cabinet having an interior deck and a movably connected lid, a prop for said lid connected to the same to move therewith, electric light means for lighting the interior of said cabinet, a switch located beneath said deck for connecting and disconnecting the light-means to and from the current, means connected with said switch and caused to be pressed in one direction to operate the switch, by the movement of said prop into lid-supporting position, and means which when not opposed by the crop operates the switch reversely.

6. In combination, a phonograph having an interior deck and a movably connected lid; a member connected to the lid to move there-

with, and working through an opening in
said deck; electric light means for lighting
the interior of said cabinet; a switch for
connecting and disconnecting the light
5 means to and from the current, said switch
being located below said deck; and means
operated by the movement of said member

with said lid when the latter is moved into
open position to close said switch.

In testimony whereof, I have signed my 10
name to this specification, this 9th day of
February, 1916.

JOSEPH HUNTER DICKINSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

Diaphragm Mounting.

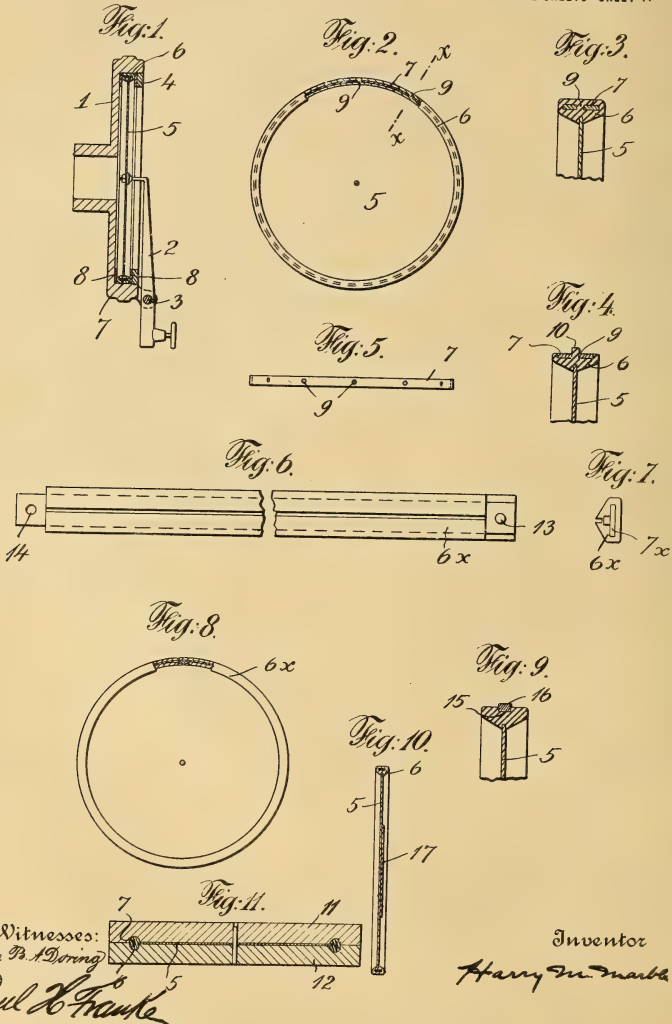
1,242,222 ----- H. M. Marble.
Patented ----- Oct. 9, 1917,
Filed ----- Sept. 11, 1914.

H. M. MARBLE.
DIAPHRAGM MOUNTING.
APPLICATION FILED SEPT. 11, 1914.

1,242,222.

Patented Oct. 9, 1917.

2 SHEETS—SHEET 1.



Witnesses:
Hear B. A. Doring

Paul E. Frank

Inventor

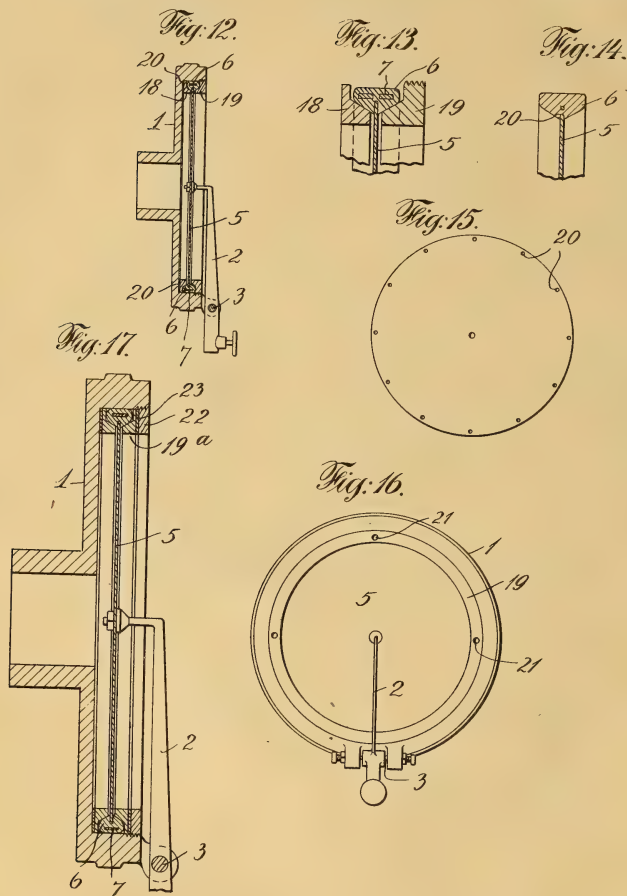
Harry M. Marble

H. M. MARBLE.
DIAPHRAGM MOUNTING.
APPLICATION FILED SEPT. 11, 1914.

1,242,222.

Patented Oct. 9, 1917.

2 SHEETS—SHEET 2.



Witnesses:
Max B. A. Doring
Paul K. Frank

Inventor
Harry M. Marble

UNITED STATES PATENT OFFICE.

HARRY M. MARBLE, OF NEWARK, NEW JERSEY, ASSIGNOR TO MAGNETIC PHONOGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DIAPHRAGM-MOUNTING.

1,242,222.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed September 11, 1914. Serial No. 861,305.

To all whom it may concern:

Be it known that I, HARRY M. MARBLE, a citizen of the United States of America, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Diaphragm-Mountings, of which the following is a specification.

My invention relates to mountings for the diaphragms of phonographs, telephones, etc., and comprises means whereby the diaphragm is held very firmly at its edge, so avoiding the distressing sounds due to looseness of the diaphragm, and yet is remarkably free for flexure such as required by the normal vibration of the diaphragm. My invention also comprises means whereby compression of the elastic or yielding material holding the diaphragm is avoided, and whereby such material is held in engagement with the diaphragm. Other features of my invention will be pointed out hereinafter.

The objects of my invention are to obtain a more mellow and "round" or "full" tone; to permit very free vibration of the diaphragm while avoiding the effects characteristic of loose diaphragms; to avoid false sounds due to play between the diaphragm mounting and the sides of the sound box or case; to make impossible material compression of the material holding the diaphragm; and to provide a diaphragm mounting which, while possessing the above desirable qualities, is simple and inexpensive in construction.

I will now proceed to describe my invention with reference to the accompanying drawings and will then point out the novel features in claims. In the drawings:

Figure 1 shows a transverse section of a typical phonograph sound box, containing a diaphragm mounted in accordance with my invention.

Fig. 2 shows a front view and partial section of a diaphragm and mounting embodying my invention.

Fig. 3 shows on a larger scale a detail transverse section on the line *x-x* of Fig. 2.

Fig. 4 is a view similar to Fig. 3, but shows an alternative construction.

Fig. 5 is a detail side view of the reinforcing and spacing ring which I employ, in some constructions.

Fig. 6 shows a side view and Fig. 7 an end view of a diaphragm mounting strip

which may be employed according to my invention.

Fig. 8 shows a face view of a diaphragm with such mounting strip thereon.

Fig. 9 is a view similar to Figs. 3 and 4, but shows a further alternative diaphragm mounting.

Fig. 10 is a further face view of a diaphragm and mounting, illustrating the application, to a diaphragm of non-magnetic material, of a central portion of magnetic material.

Fig. 11 shows a transverse section of a mold or die such as may be used in forming the mounting ring, as hereinafter described, or in the vulcanization or other heating, or pressure, or heating and pressure, treatment, a diaphragm being shown in place within such mold or die.

Fig. 12 shows a transverse section of a typical phonograph sound box, and illustrates alternative means for holding within that sound box a diaphragm having a mounting ring such as above referred to, and for putting that diaphragm under tension if so desired.

Fig. 13 is a fragmentary sectional view on a larger scale, of a portion of the diaphragm with its mounting ring and the co-acting clamping rings.

Fig. 14 shows a fragmentary transverse section on an enlarged scale, of an alternative form of mounting ring and diaphragm.

Fig. 15 shows a face view of the edge-perforated diaphragm employed in the Fig. 14 construction and Fig. 16 shows a front view of the box shown in Fig. 12.

Fig. 17 is a transverse section of a sound box on an enlarged scale, illustrating alternative means for advancing the movable wedge ring.

It is well known to those who have experimented in the endeavor to improve phonographic recording and reproduction of sound, that the manner in which the diaphragm of a recorder or reproducer is held, has much to do with the quality of sounds recorded or reproduced. The diaphragms of phonograph recorders are frequently held at their edges, within a metallic case, by a thin band of wax holding the diaphragm against the case much as, in an ordinary window frame, the window panes are held in the frame by putty; though occasionally recorder diaphragms are mounted otherwise.

In the case of phonograph reproducers or so-called "sound-boxes" the diaphragms are commonly held between rubber gaskets; though it has been proposed, without much success, so far as I am informed, to hold the diaphragm by a molded rubber ring having on its inner side a groove receiving the edge of the diaphragm, the ring itself being clamped in the case at points well outside of the edge of the diaphragm. In the use of this latter construction, according to my experience, at times a peculiar fluttering sound is noticed, due undoubtedly to excessive freedom of the diaphragm at its edges. It is well known to those who have had experience with the more familiar constructions, wherein the diaphragm is clamped between gaskets, that it is practically impossible to hold the diaphragm between such gaskets with sufficient pressure to eliminate sounds due to a loose diaphragm, without exerting such compression on the diaphragm as materially "kills" its tone, making the sounds dull; dead; and without natural resonance. Furthermore, a considerable amount of skill is required in the assembling of sound boxes wherein the diaphragm is clamped between gaskets; viz.:—skill in regulating to the proper degree, the compression of the gaskets, so as to obtain as free and resonant tone as possible without too much of the disturbance characteristic of a loose diaphragm.

According to my present invention I mold to the edge of the diaphragm a mounting ring, which engages and adheres firmly to the diaphragm in a narrow zone at the extreme edge of the diaphragm—the said mounting ring usually overlapping and adhering to such diaphragm for a width of one sixty-fourth to one thirty-second of an inch from the edge of the diaphragm.

Rubber appears to be the best material from which to make this mounting ring, though I have obtained very good results from mounting rings made of fairly hard wax, such for example as the wax of phonograph cylinders; which wax, though hard at ordinary atmospheric temperatures, still is slightly yielding, though not as yielding as rubber. I have even obtained very good results from mounting rings made of lead alloys, such as Babbitt metal, type metal, etc. In all cases the mounting ring adheres to the surface of the diaphragm, holding the same without a trace of play between the diaphragm and the mounting ring; yet, particularly in the case of the rubber mounting ring, the diaphragm is absolutely free to flex to its extreme edge. I commonly provide within the rubber mounting ring, but spaced away from the edge of the diaphragm, a reinforcing ring, of metal or other suitable material, which takes the thrust of the clamping members between which the mounting ring is held, precluding any material compression of the rubber, while at the same time holding the rubber to the edge portion of the diaphragm and precluding any action which might otherwise tend to break the adhesion of the rubber to the diaphragm, and also precluding all "fluttering" of the diaphragm.

Sound boxes containing diaphragms so mounted in rubber mounting rings have a notably more resonant, full and round tone than do sound boxes wherein the diaphragm is mounted between gaskets; there is absolutely no evidence of looseness of the diaphragm; the volume of tone obtained is at least as great, under equal conditions, as that obtained when the diaphragm is mounted between gaskets holding that diaphragm rather loosely; and it is absolutely impossible for the user of the sound box to spoil the tone of the sound box by undue compression of the rubber.

Referring now to the accompanying drawings, and at first to Figs. 1-5 inclusive, numeral 1 designates the case of a typical phonograph reproducer or sound box, numeral 2 the vibrating stylus or needle-lever of the box, pivoted at 3, and 4 a clamping ring screw threaded to the inner surface of the case 1 and serving to hold the diaphragm and its mounting in place. 5 designates the diaphragm itself. This diaphragm may be of mica (the material commonly employed for phonograph diaphragms) or celluloid or material of like physical properties, or gelatin, or viscose or like material derived from cellulose, or cellulose acetate, or paper, (preferably varnished or otherwise coated to make it impervious to air or moisture); or celluloid, paper, gelatin, viscose, etc., having secured to it a more rigid material, such as mica, glass, or metal, so forming what is termed in the art a "piston diaphragm"; or glass, or thin sheet metal, such for example as thin sheet iron, thin sheet aluminum, thin sheet magnesium, etc.; or any other suitable somewhat flexible material. 6 designates the mounting ring, which may be of rubber, or wax, or other non-resonant and preferably at least slightly yielding material; though as above stated, I have obtained very good results from rigid mounting rings 6 of low melting metal, such as Babbitt metal or type metal, and regard such metal mounting ring as within my invention. 7 designates the reinforcing or binding ring of unyielding material, above referred to, embedded within the material 6, and preferably spaced away from the edge of the diaphragm; which reinforcing ring is commonly employed only when the material 6 is rubber or soft wax or some other material which yields materially to moderate pressure at ordinary atmospheric temperatures. 8-8 designate suitable gas-

kets, of paper, thin rubber, or other suitable material, interposed between the mounting ring 6 and the bottom of the case, on the one hand, and the clamping ring 4, on the other hand. However, these gaskets 8 are not material, and may be omitted in many cases, particularly when the material 6 is fairly elastic rubber. By the term rubber as used herein, I mean to include, of course, the ordinary commercial rubber compounds, which often contain considerable mineral matter and "shoddy" as well as other materials, and are capable of vulcanization.

As indicated particularly in Fig. 3, the reinforcing ring 7 may be surrounded completely by the material 6, the thickness of the material 6 outside of the edges of the ring 7 being, preferably, slight, so that compression of such edge portions of the material 6 may not affect materially that portion of the material 6 within which the diaphragm 5 is gripped. As indicated particularly in Fig. 3, and Fig. 5, the ring 7 is preferably provided with a series of perforations 9 whereby the portions of the material 6 on the two sides of this ring 7 are united internally, as well as at the edges. Or, as illustrated in Fig. 4, the main body of the material 6 may extend only to the back of the ring 7, portions of the material 6 extending through the holes 9 of ring 7 forming buffer-projections 10 adapted to contact with the side of the case 1 so as to prevent contact of the ring 7 with the side of the case. Both in the construction shown in Fig. 3, and in the construction shown in Fig. 4, only the material 6 of the mounting ring can come in contact with the side of the case 1, and therefore there can be no rattling due to contact of a metal portion of the mounting with the sides of the case 1.

As will be seen with reference to Figs. 3 and 4, (which show the parts greatly enlarged), the engagement of the material 6 with the edge portion of the diaphragm 5, (particularly when the diaphragm is of mica, glass or steel or other high resilient material) is in an extremely narrow zone, a zone which, in practice, is from one sixty-fourth to one thirty-second of an inch from the outside of the diaphragm inward. The mounting ring is readily applied to the diaphragm by molding, an ordinary two part mold being commonly used. When the material 6 of the mounting ring is of rubber, the grooves of the two sides of the mold, corresponding to the mounting ring, are filled with suitable unvulcanized rubber, or rubber composition or the like, the reinforcing ring 7 is pressed into the rubber composition in one side of the mold, the diaphragm 5 is placed within the mold and properly centered, and then the two parts of the mold

are placed together and by pressure, and by heat such as required for vulcanization of the rubber compound, the rubber is united with the diaphragm and with the ring 7, and the two parts of the rubber are united into one integral whole. The heat of vulcanization is not sufficient to injure a diaphragm of mica, glass, cellulose acetate, viscose, paper, metal and various other flexible materials. When the material 6 is wax or material of a waxy nature, the wax may be melted and poured into the mold already containing the diaphragm and the reinforcing ring 7 (if that reinforcing ring is to be employed); or the grooves of the mold, corresponding to the mounting ring, may be filled with the wax in a plastic condition (such wax having been rendered plastic by slight heat) the diaphragm and reinforcing ring 7 (if the latter be employed) being then placed within one part of the mold, and the two parts of the mold being joined, and, by pressure, and (if required) by slight application of heat, the wax is united to the diaphragm and ring 7, and the two parts of wax are united into one integral whole. In this way a celluloid diaphragm having a wax mounting ring may be produced readily, the heat required to soften most of the waxes not being sufficient to injure the celluloid.

Fig. 11 shows a mold or die such as above referred to, 11 and 12 designating the two parts of the mold or die, 5 designating the diaphragm and 6 designating the material of the mounting ring and 7 the reinforcing ring within the mold.

Or, as illustrated in Figs. 6, 7 and 8, the mounting ring may be formed in the first instance as a grooved strip 6* and the reinforcing ring (if employed) may be embedded in this strip as a straight strip 7*. Such a grooved strip as 6* is readily formed of rubber or wax or like plastic material, by well known methods. The strip thus prepared may then be wrapped around the diaphragm, the edge of the diaphragm fitting within the groove of the strip. If the material 6* of such strip be of rubber, the strip will then be placed within a mold and vulcanized. If the material 6* be of wax the diaphragm with such strip upon it is preferably placed in the mold, or pressure die, and by pressure, aided, if required, by slight heat, the wax is united to the diaphragm and the two ends of the wax strip joined together. When a reinforcing strip 7* is provided in the strip 6* suitable means may be provided for locking together the ends of the strips 7*; for example, the two ends of the strips 7* may be provided, one with a pin 13 and the other with a hole 14 to receive such pin. After the pin 13 is engaged with the hole 14 a drop of solder applied at the joint will fasten the parts se-

curely; and then, if desired, rubber cement may be applied at the joint to cover the exposed metal.

However, I do not limit myself to the use of a reinforcing member 7 within the material 6, and in Fig. 9 I have shown a construction wherein such reinforcing material is omitted. When the material of the mounting ring is relatively hard (for example, when it is relatively hard wax, or metal) I prefer to provide in the outside of this ring, a groove 15, as illustrated in Fig. 9, and to insert in this groove a ring 16 of cushioning material, such for example as rubber, felt or cord, which cushioning ring will be the portion of the mounting to contact with the sides of the box or case 1, and will preclude any noise due to such contact.

Telephone transmitter diaphragms may be mounted in all respects as are the diaphragms of phonograph recorders and reproducers; and it is entirely practicable, in a telephone transmitter, to employ a diaphragm of non-magnetic material; for example, celluloid, gelatin, viscose, cellulose acetate, paper, glass, mica, aluminum, etc. Telephone receiver diaphragms must, ordinarily, be provided with a layer of magnetic material, if not constructed wholly of magnetic material. In Fig. 10 I have illustrated such a construction, wherein the main diaphragm, designated by numeral 5, as in Fig. 1, and provided with a mounting ring as shown in Fig. 1, has cemented to it, or otherwise secured to it, a thin disk of magnetic material, 17. A material gain in clarity of articulation by telephone receivers may be obtained by means of the construction shown in Fig. 10, the main diaphragm being of some relatively flexible material, such for example as celluloid, paper, viscose, or cellulose acetate.

Sometimes I form the main diaphragms for phonograph recorders and reproducers and telephone transmitters, etc., of quite flexible material such as celluloid, viscose, cellulose acetate, gelatin or paper, cementing to such main diaphragm a smaller plate of more rigid material, such as mica, glass, aluminum or magnesium, as illustrated in Fig. 10, so forming what is known as a "piston diaphragm."

I am aware that it has been proposed heretofore to secure a diaphragm of mica or the like to a massive mounting ring of non-yielding material by a thin layer of rubber cement engaging the edge only of the diaphragm. Such construction does not possess the advantages of the diaphragm mounting herein illustrated and described. The elasticity of the cement referred to is an uncertain quantity, particularly after it has aged; it does not hold the diaphragm securely and the mounting of the diaphragm in said cement requires extreme skill. The

various mounting ring constructions embodied in my invention require only relatively unskilled labor, and the diaphragms so mounted may be produced at low cost; and when so produced they may be assembled with the other parts of the sound box structure with much greater facility than attends the assembling of the parts of the former sound box structure.

The adhesion of the various types of mounting rings referred to herein as embodying my invention, to the diaphragms, is thereby distinguished from the adhesion produced by merely cementing a rubber gasket or mounting ring to a diaphragm, as is done sometimes. In all of the various embodiments of my invention, the material of the mounting ring, at some time during the process of applying that material to the diaphragm, is under considerable pressure at a time when the material is undergoing an internal change. Thus, when the material of the mounting ring is rubber, that rubber is under pressure during the vulcanization period; when the material of the mounting ring is wax, that wax is under pressure during the solidification of the wax (if the wax be cast in the mold) or during the pressing of the wax (if the wax be united to the diaphragm by pressure as above described). And when the material of the mounting ring is cast metal, that material is under internal pressure due to contraction, while solidifying. As a result, the internal stresses of the material of the mounting ring are such as to tend to hold that material to the diaphragm; producing an adhesion stronger than that due to mere intimate contact. Moreover, when cement is employed to secure adhesion of a mounting ring to the diaphragm, a layer of this cement is necessarily pressed between the material of the mounting ring and the diaphragm, and the elasticity of this cement layer is an uncertain quantity, particularly after it has aged; also cement is very apt to lose its adhesion to very smooth and hard materials, such as mica.

In some cases instead of holding the diaphragm, by means of its mounting ring, between clamping members acting upon the edge of that mounting ring, as shown in Fig. 1, I provide holding members engaging the inner surface of such mounting ring and in some cases I put the diaphragm and its mounting ring under tension, by means of such holding members. This construction is illustrated in Figs. 12-16 inclusive. The diaphragm and its mounting ring may be in all respects the same as in the constructions previously illustrated and described, but the case is provided with two wedge-rings, 18 and 19, one of which may rest loosely within the box, being separated therefrom by a gasket 20, the other being so

mounted (as for example by screw threads engaging corresponding threads in the side of the box) that it may be moved toward and from the diaphragm. It will be seen that by moving such movable ring 19 toward the diaphragm the mounting ring 6 is clamped firmly between the wedge rings 18 and 19; and if the material of the mounting ring be at all yielding in its nature, further slight movement of the clamping ring 19 toward the diaphragm will place that clamping ring under tension, which may be regulated by moving the ring 19 nearer to or farther away from the diaphragm. It will also be seen that, by so placing the mounting ring under tension, the diaphragm itself, if of material which is at all extensible, is also placed under tension. This ability to place the diaphragm itself under tension is extremely desirable, when that diaphragm is formed of material such as celluloid, viscose, cellulose acetate, gelatin, paper, or thin sheet metal; for a slightly taut diaphragm gives a far clearer, fuller, and rounder tone than does a flabby diaphragm.

I am aware that heretofore various constructions have been proposed, whereby diaphragms of more or less extensible material may be drawn taut; but the particular type of clamping arrangement shown in Figs. 12 and 13 permits the use of a larger diaphragm, within given dimensions of sound box, than any other diaphragm tensioning device of which I am aware; and also is very simple, inexpensive, and easy to adjust, and so holds the diaphragm and its mounting ring that very free vibration of the diaphragm is permitted; such compression of the material of the mounting ring as exists being in a direction radially outward, with respect to the diaphragm, so that such compression does not interfere in the slightest degree with free vibration of the diaphragm.

In the arrangement shown in Figs. 12-16 inclusive and other like arrangements for placing under tension a diaphragm having a mounting ring constructed in accordance with my invention, or for placing under a tension the mounting ring itself, the reinforcing ring 7 may or may not be used, as preferred. In Figs. 12 and 13 I have illustrated the mounting ring as provided with such reinforcing ring 7; while in Fig. 14 I have shown the mounting ring as omitted.

I have found that the material of mounting rings applied to diaphragms as above described, adheres to such diaphragm so tightly that the mounting ring may be placed under considerable tension, so as to stretch the diaphragm materially, without breaking the adhesion between the mounting ring and the diaphragm; but to absolutely prevent any separation of the mounting ring from the diaphragm, the latter may be provided with perforations 20 near its edges,

as illustrated in Figs. 14 and 15, in which case the material of the mounting ring will interlock with such perforations. In the construction shown in Figs. 12 and 13, wherein the clamping ring 19 is screw connected to the box or case 1, said ring 19 may be provided with recesses 21, for engagement of such ring by a suitable key or spanner; for convenience in screwing such ring 19 in or out; or any other convenient means may be provided for rotating such ring 19.

As illustrated in Fig. 17, the movable wedge ring, designated in such figure by numeral 19^a, instead of being itself screw threaded may be pressed forward by a further ring 22, itself screw threaded to the box. This construction avoids rotation of the ring 19. In such case there is, preferably, a thin washer of paper 23 or the like between rings 19^a and 22.

The particular type of acoustic device in which diaphragms having mountings embodying my invention are employed, is relatively unimportant; and my invention is applicable, generally, to all locations in which flexible diaphragms are employed; therefore I do not limit myself to the application of my invention to phonograph sound boxes, telephone transmitters and receivers, etc.

What I claim is:—

1. As an article of manufacture, a diaphragm of flexible material surrounded at its edge by a mounting ring of at least slightly yielding nature, having within it a reinforcing ring of relatively rigid material.

2. As an article of manufacture, a diaphragm of flexible material surrounded at its edge by a mounting ring of at least slightly yielding nature, having within it a reinforcing ring of relatively rigid material spaced away from the edge of the diaphragm.

3. As an article of manufacture, a diaphragm of flexible material surrounded at its edge by a mounting ring of at least slightly yielding nature, having within it a reinforcing ring of relatively rigid material spaced away from the edge of the diaphragm and separated from such diaphragm edge by a portion of such yielding material.

4. As an article of manufacture, a diaphragm of flexible material, surrounded at its edge by a mounting ring of at least slightly yielding nature, and a reinforcing ring secured to such yielding material for reinforcing the same.

5. As an article of manufacture, a diaphragm of flexible material, surrounded at its edge by a mounting ring of at least slightly yielding nature, and a reinforcing ring of less elastic material embedded in such yielding material.

6. As an article of manufacture, a diaphragm of flexible material, surrounded at its edge by a mounting ring of at least slightly yielding nature, and a perforate reinforcing ring united to such yielding material by portions of such yielding material interlocked with the perforations of said ring.

7. As an article of manufacture, a diaphragm of flexible material surrounded at its edge by a mounting ring of at least slightly yielding nature, and a reinforcing ring of relatively rigid material united to such yielding material, a portion of such yielding material being superposed upon the outer side of such reinforcing ring, and acting as buffer material.

8. As an article of manufacture, a diaphragm of flexible material surrounded at its edge by a mounting ring of at least slightly yielding nature, extending from the edge of the diaphragm inward a short distance, and means for reinforcing that portion of the flexible material which is in immediate proximity to the edge of the diaphragm, whereby fluttering of the diaphragm is prevented.

9. As an article of manufacture, a mounting strip for forming mounting rings for diaphragms, comprising a strip of flexible and at least slightly yielding material having secured to it a reinforcing strip of relatively rigid material.

10. The combination with a diaphragm case, of a diaphragm therein having a substantially peripheral projecting rim and wedge members engaging such rim and so supporting the diaphragm throughout the periphery with an outward tensioning strain.

11. The combination with a diaphragm case, of a diaphragm therein having a substantially peripheral projecting rim and

wedge rings engaging such rim and so supporting the diaphragm throughout the periphery with an outward tensioning strain. 45

12. The combination with a diaphragm case, of a diaphragm therein having a substantially peripheral projecting rim and wedge members engaging such rim and so supporting the diaphragm throughout the periphery with an outward tensioning strain, and means for moving one of said wedge members toward and from the diaphragm.

13. The combination with a diaphragm case, of a diaphragm therein having a substantially peripheral projecting rim and wedge rings engaging such rim and so supporting the diaphragm throughout the periphery with an outward tensioning strain, and means for moving one of said wedge rings toward and from the diaphragm. 60

14. The combination with a diaphragm case, of a diaphragm therein having a substantially peripheral projecting rim of slightly yielding nature, and wedge members engaging such rim and so supporting the diaphragm throughout the periphery with an outward tensioning strain, whereby the material of such rim may be placed under tension. 70

15. The combination with a diaphragm case, of a diaphragm therein having a substantially peripheral projecting rim, and means, engaging the inner surface of such rim, supporting the diaphragm within the case under peripheral outward tension. 75

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HARRY M. MARBLE.

Witnesses:

MAY I. TRIMBLE,
PAUL H. FRANKE.

SOUND POST MOUNTING FOR PHONOGRAPHS.

1,242,227 ----- J. G. Nolen.
Patented ---- Oct. 9, 1917,
Filed ----- June 28, 1916.

J. G. NOLEN.
SOUND POST MOUNTING FOR PHONOGRAPHS.
APPLICATION FILED JUNE 28, 1916.

1,242,227.

Patented Oct. 9, 1917.

Fig. 1.

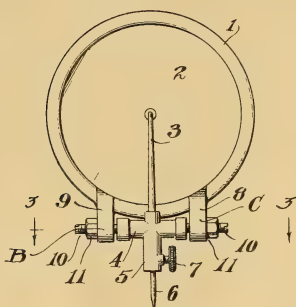


Fig. 2.



Fig. 5.



Fig. 6.

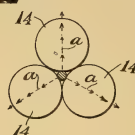


Fig. 3.

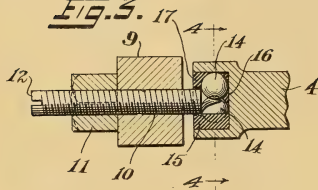


Fig. 4.



Witnesses:
Chas. C. Whitman.

H. D. Penney

Inventor:
James G. Nolen.
by W. H. Richards.
His Atty.

UNITED STATES PATENT OFFICE.

JAMES G. NOLEN, OF NEW YORK, N. Y.

SOUND-POST MOUNTING FOR PHONOGRAPHS.

1,242,227.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed June 28, 1916. Serial No. 106,293.

To all whom it may concern:

Be it known that I, JAMES G. NOLEN, a citizen of the United States, residing in New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Sound-Post Mountings for Phonographs, of which the following is a specification.

My present invention relates to an improvement in sound boxes and like sound producing devices, and has for its object to provide a rigid, tensioned and substantially frictionless stylus bar mounting therefor which may be adjustable for wear, is self centering and insures a true axial rotation about the pivotal point of such stylus bar without end or side play thereof, thereby counteracting the so called "needling," and "blasting sounds" of various kinds that occur owing to looseness of the pivots in their trunnions, thereby improving the clarity of tone produced therefrom.

The important advantage of my construction is that it permits of true transmission of the wave oscillations imparted to the needle, through the stylus bar and sound-post to the diaphragm without any loss due to improperly fitted or worn trunnions which permit of considerable play, and therefore, owing to the ratios of arm lengths the loss of considerable diaphragm movement, and therefore reduce the volume of tone as well as muffling enunciation of spoken parts and songs.

In the accompanying drawings, Figure 1 is a front elevation of my device; Fig. 2 is a side elevation thereof.

Fig. 3 is an enlarged sectional view of one of the trunnions.

Fig. 4 is another sectional view thereof.

Fig. 5 shows an enlarged end portion of the pivot.

Fig. 6 is a diagrammatic view showing certain principles involved therein.

In Fig. 1 there is shown a diaphragm mounting comprising a threaded diaphragm frame 1 which contains therein the usual mica diaphragm 2, and attached thereto, in the customary manner, is a sound-post 3 which has a stylus bar 4 rigidly attached

thereto, said stylus bar 4 having an extension 5 which is substantially an extension of the sound-post 3 and stylus bar 4, and having a needle 6 held affixed therein by means of the usual thumb nut 7. So far, the construction set forth is substantially standard.

Arranged at one side of the frame member 1 is a pair of integral, down standing lugs 8 and 9 which lugs are threaded, in the usual manner as indicated in Fig. 3, to receive therein an adjustable threaded pivot member 10. There is also shown in Fig. 3 which is a sectional view of the lug 9 taken on line 3-3 looking in the direction of the arrows, in addition to the pivotal member 10, a lock nut 11, which permits of locking the pivot members 10 after they have been adjusted, with a screw driver, by means of the slot 12 in one end thereof. By referring to Fig. 5, which is an enlarged fragmental view of the pivotal member 10, it will be noted that the trunnion end 13 thereof is pointed or substantially cone shaped, the surface of which however being slightly concave in order to permit its engagement with the faces of the steel balls 14 which are arranged in the chambered end 15 of the sound-post stylus bar 4 and which chambered portion 15, as indicated in Fig. 4, is only large enough to permit of the introduction of said steel balls, without any play, thereby insuring contacts between the balls themselves, between the outer peripheries thereof and the outside edge or wall of the chamber 14.

The chamber 14 is sufficiently recessed to permit the introduction of the balls to any desired depth and at the same time permitting the balls to have contact with the back wall 16 thereof, as indicated in Fig. 3, and it is obvious that any pressures exercised upon the balls, by the convex conical point 13 of one pivot member 10 is transmitted to the opposite pivotal member 10.

It will be noted that the conical convex point 13 being introduced in the interstices between the 3 balls 13 would only have a line contact therewith as indicated by the arrows *a*, Fig. 6, and that this contact not

only reduces surface friction but also insures rigid coaxial alinement between the opposite opposed bearings on the diaphragm frame and which are generally denoted by B and C.

As a further means for counteracting any probable oscillation of the bearing members, the recess chamber 15 is filled with a suitable resilient vibration-absorbing material 17, as is indicated in Figs. 3 and 4, which material in the present instance, may be of pure Pará rubber suitably vulcanized therein, although any like material may be used. It is obvious that an opening must be left in the vibration-absorbing material of sufficient diameter to permit the introduction therein of the pivotal members 10—10 so that they may have a clean metal to metal contact with the steel balls, but all of the remaining interstices should be filled with the compound, thereby forming a compounded bearing of non-yielding and yielding material combined, the said non-yielding material forming non-compressible and stress assuming supports and the other material being a vibration non-conductor.

The steel balls and the convex trunnion point 13 should be hardened and highly polished. While I have shown the pivotal points to be convex, so as to assume a surface line contact with the faces of the balls, I may also make the surface of said cone straight, or concave, whereby a point contact only is made, as I have discovered that very little difference is made so long as the point is substantially cone shaped, thereby forming an expanding means for creating opposing tension between the balls.

I claim:

1. A stylus bar mounting for phonograph sound boxes comprising supports carried by the sound box, a stylus bar pivotally mounted between said supports, needle holding means and a sound post carried by the stylus bar, the said stylus bar having recessed chambers on its ends, a plurality of steel balls therein, adjustable cone pivots carried by said supports, the cone ends thereof being in contact with said steel balls, and locking means for locking said cone pointed pivots in rigid and operative connection with said balls, the recess in which said balls are mounted being filled with a pure Pará rubber.

2. A stylus bar mounting for phonograph sound boxes comprising supports thereon, a stylus bar mounted on said supports, a bearing between said stylus bar and the supports, said bearing comprising a recess, steel balls set therein, pivotal members in engagement with said balls, the interstices around said balls being filled with a vibration absorbing material.

3. A stylus bar mounting for phonograph sound boxes, comprising supports carried by the sound box, the stylus bar having bearings therein, bearings comprising pivots carried by the supports, and metal members mounted in vibration absorbing material carried by the stylus bar, the said pivots being in contact with the said metal members.

4. A stylus bar mounting for phonograph sound boxes comprising supports carried by the sound box, the stylus bar having bearings therein, bearings comprising convex conical pivots carried by the supports, and three metal balls arranged in contact with each other and mounted in vibration absorbing material, said balls and material being carried by the stylus bar, the said pivots being in contact with the said balls.

5. A stylus bar mounting for phonograph sound boxes comprising supports carried by the sound box, the stylus bar having bearings therein, bearings comprising three metal balls mounted in vibration absorbing material and arranged in contact with each other, and convex conical pivots fitting within the space between the said balls.

6. A stylus bar mounting for phonograph sound boxes comprising supports carried by the sound box, the stylus bar having bearings therein, bearings comprising three metal balls mounted in vibration absorbing material and arranged in contact with each other, and screw threaded members adjustably mounted in the said supports and having convex conical ends fitting within the space between the said balls.

7. A stylus bar mounting for phonograph sound boxes comprising supports carried by the sound box, the stylus bar having bearings therein, bearings comprising three metal balls mounted in vibration absorbing material and arranged in contact with each other, and screw threaded members adjustably mounted in the said supports and having convex conical ends fitting within the space between the said balls, said pivots adapted to be adjusted to lock the conical convex ends thereof rigidly against the three balls.

8. A stylus bar mounting for phonograph sound boxes comprising bearings between said sound box and the stylus bar, said bearings comprising metal pivots and contacting metal balls, said pivots in contact with said balls, and said balls mounted in vibration absorbing material.

9. A stylus bar mounting for phonograph sound boxes comprising bearings between the said sound box and the stylus bar, said bearings comprising metal pivots and contacting metal balls, said pivots in contact with said balls and said balls mounted in

vibration absorbing material, and means for adjusting the pivots against the said balls to a predetermined tension.

10. A stylus bar mounting for phonograph sound boxes comprising bearings between the said sound box and the stylus bar, said bearings comprising supports, contacting metal balls within the supports, metal

pivots in contact with said balls, said balls mounted in vibration absorbing material, and means for adjusting the pivots against the said balls to a predetermined tension.

JAMES G. NOLEN.

Witnesses:

HENRY I. SIEGEL,

HAROLD D. PENNEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

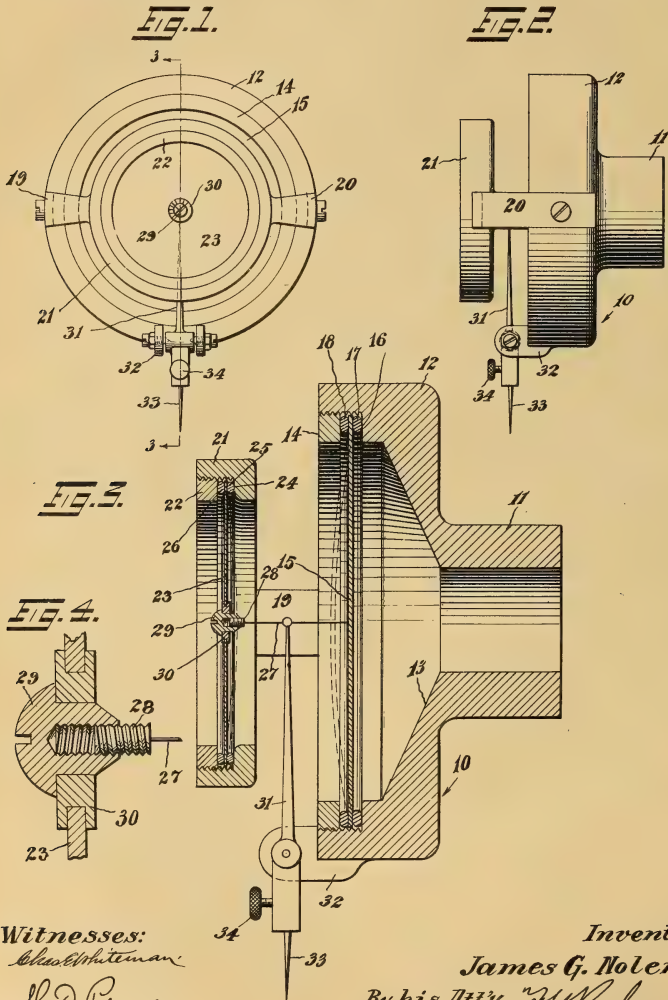
DIAPHRAGM TENSIONING MEANS.

1,242,228 ----- J. G. Nolen.
Patented --- Oct. 9, 1917,
Filed ----- Mar. 19, 1917.

J. G. NOLEN.
DIAPHRAGM TENSIONING MEANS.
APPLICATION FILED MAR. 19, 1917.

1,242,228.

Patented Oct. 9, 1917.



Witnesses:

Charles Whitman

H. D. Penney

Inventor:

James G. Nolen.

By his Atty. W. H. Richard.

UNITED STATES PATENT OFFICE.

JAMES G. NOLEN, OF NEW YORK, N. Y.

DIAPHRAGM-TENSIONING MEANS.

1,242,228.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed March 19, 1917. Serial No. 155,687.

To all whom it may concern:

Be it known that I, JAMES G. NOLEN, a citizen of the United States, residing in New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Diaphragm-Tensioning Means, of which the following is a specification.

This invention relates to sound transmitters in general, and more especially to transmitters for talking machines.

With sound transmitters it has been found that the disk ordinarily used, at a given tension, does not equally transmit the low tones and high tones, and that, when the disk is substantially flexible as distinct from being placed under tension, the lower tones produced by the bass singer, bass viol, would be best produced, and that on the other hand, when the disk is placed under tension, the higher tones produced by the soprano, piccolo, violin and the like, would be best produced.

To this end, the present invention aims to provide a means whereby the transmitting disk may, with facility, be adjusted to suit the pitch of the sound to be produced.

The present invention further contemplates the provision of certain features of construction particularly adapted for carrying out the main purpose of the present invention, to wit: the provision of a second disk which is connected to the main transmitting disk by a tension member that is adjustable to draw the centers of the disks toward one another.

These and other features, capabilities, and advantages of the invention will appear from the subjoined detail description of one specific embodiment of the invention illustrated in the accompanying drawing, in which—

Figure 1 is an end elevation of a device made in accordance with the present invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is an enlarged section on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged detail view showing the connection of the tensioning member to the second disk of the device.

In the embodiment illustrated there is provided a housing 10 having a diminished cylindrical portion 11, from which the sound issues and an enlarged cylindrical portion 12, the inner periphery of the portion 11 graduating into the inner periphery of the portion 12 by means of a conical surface 13.

The outer end of the portion 12 is internally screw threaded to receive the annulus 14 which is adapted to press and firmly secure the disk 15, preferably composed of mica, against the shoulder 16 on the portion 12, the disk 15 being spaced from the shoulder 16 by the rubber gasket 17 and from the annulus 14 by the rubber gasket 18.

Secured to the portion 12 by the strips 19 and 20 is the annular frame 21, the end of the frame removed from the housing 10 being internally screw threaded to receive the annulus 22 which presses and firmly secures the disk 23, preferably composed of mica, against the shoulder 24 of the frame 21, the disk 23 being spaced from the shoulder 24 by the rubber gasket 25 and from the annulus 22 by the rubber gasket 26.

The disks 15 and 23 are connected to one another by a tensioning member such as the wire 27. The wire is preferably secured to the center of the disk 15, at one end, and at its other end secured to the screw 28 which is screw threadedly secured in the bore of the screw 29, which extends through the disk member 30. Secured to the center of the disk 23, the wire 27 is fixed against rotation by its connection with the disk 15, and consequently when the screw 29 is turned, such screw 29 will turn relative to the screw 28 fixed to the wire 27 and thereby permit adjusting the distance between the disks 15 and 23 and the consequent tension or flexibility in the disks 15 and 23.

The disk 23, of course, is mainly provided to form a support for the wire 27, the main object of the arrangement being to facilitate the tensioning of the disk 15, or the reduction of the tension in such disk 15.

The wire 27 has secured to it a lever member 31 which is fulcrumed to the bracket 32, extending from the lower end of the portion 12. The lower end of the lever 31 is provided with a seat for the needle 33 and a screw 34 by means of which the needle 33 may be secured to such lever 31 in the usual manner.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention.

I claim:

1. In a phonographic sound box, etc., a housing; a transmitting-disk supported by the housing; a second tensioning disk supported parallel to the transmitting disk on a common central axial line; a needle-

holder-bar pivotally supported by the housing with one end in line with the common axis of the two disks; a wire connected at the two ends with the two disks at their axial centers, and with the end of the needle-bar at its center; and means for tensioning the wire so as to draw the centers of the disks toward each other.

2. In a phonographic sound box, etc., a housing; a transmitting-disk supported by the housing; a second tensioning disk supported parallel to the transmitting disk on a common central axial line; a needle-holder-bar pivotally supported by the housing with one end in line with the common axis of the two disks; a central female screw-threaded hub secured to the tensioning disk; a tensioning-screw working in the hub; and a tensioning wire connected adjacent to its center with the needle-holder-bar, and at one end with the transmitting-disk, and at the other with the tensioning-screw.

3. In a sound transmitter, the combination with a sound transmitting disk, a second disk, a needle, a wire connecting said disks to one another, means for connecting said needle to said wire, and means for drawing the disks toward one another according to the average pitch of sounds to be produced.

4. In a sound transmitter, the combination with a transmitting disk, a second disk, a needle, means for connecting said disks to one another, means for connecting said

needle to said connecting means, and means for drawing the disks toward one another according to the average pitch of sounds to be produced.

5. In a sound transmitter, the combination with a transmitting disk, a second disk, a needle, means for drawing the disks toward one another according to the average pitch of sounds to be produced, and means for connecting said needle to said drawing means.

6. In a sound transmitter, the combination with a transmitting disk, a second disk mounted parallel to said transmitting disk, a needle, means for drawing the disks toward one another according to the average pitch of sounds to be produced, and means for connecting said needle to said drawing means.

7. In a sound transmitter, the combination with a transmitting disk, a second disk, a housing for said transmitting disk, a bracket extending from said housing for mounting said second disk parallel to said transmitting disk, a needle, a wire connected to said transmitting disk, adjustable means connecting said second disk with said wire whereby the disks may be drawn toward one another according to the average pitch of sounds to be produced, and means for connecting said needle to said wire.

JAMES G. NOLEN.

Witnesses:

H. M. KILPATRICK,
H. D. PENNEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONIC APPARATUS.

1,242,372 ----- S. C. Porter,
Patented ----- Oct. 9, 1917,
Filed ----- Nov. 13, 1914.

1,242,372.

Patented Oct. 9, 1917.

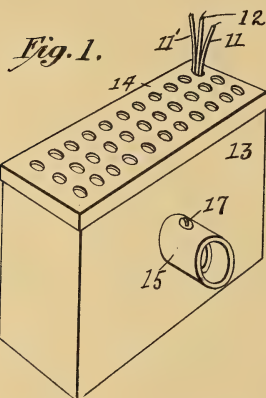


Fig. 3.

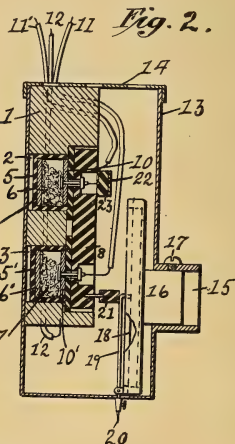
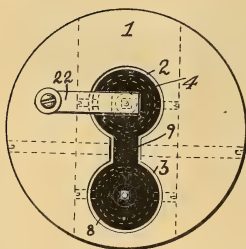
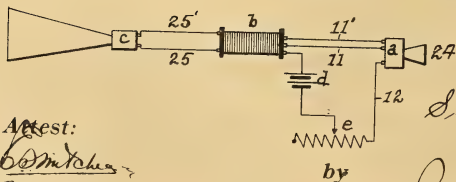


Fig. 4.



Attest:
Wm. H. Richardson
W. H. Richardson

Stephen C. Porter
 Inventor:

Robt. B. Killgore
 Atty

UNITED STATES PATENT OFFICE.

STEPHEN C. PORTER, OF BROOKLYN, NEW YORK.

PHONIC APPARATUS.

1,242,372.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed November 13, 1914. Serial No. 871,914.

To all whom it may concern:

Be it known that I, STEPHEN C. PORTER, a citizen of the United States, residing at borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Phonic Apparatus, of which the following is a specification.

My invention relates to improvements in phonic apparatus primarily for use in transmitting the sound waves of phonographic records electrically for use in the production of talking moving pictures. The device may also be used as a loud speaking telephone for making announcements in public places. My object is the production of a light, simple, effective apparatus which will faithfully transmit all the sounds and overtones with freedom from blast and foreign noises and reproduce them loudly and naturally.

In the drawing Figure 1 is a view of my complete apparatus; Fig. 2 a sectional view through the apparatus; Fig. 3 a back view of the electrical element with the casing removed; and Fig. 4 a diagram of the wiring employed.

The apparatus consists of a base block 1 having pockets 2 and 3 therein extending therethrough. On the inside or back at 4 the openings merge forming a general resemblance to a figure eight as shown in Fig. 3. Each of these pockets 2 and 3 has a cup 5, 5' of insulation material secured therein. Each cup has a disk of conducting material 6, 6' such as carbon in the bottom thereof, the cup containing carbon granules or balls 7. A common cover or arm 8 of insulating material is pivoted at 9 to the base block with the conducting disks 10 10' secured to the inner face in contact with the carbon 7. Disks 10 and 10' each have a line wire 11—11' leading therefrom. The disks 6, 6' are grounded on the base block and have the line wire 12 in electrical connection therewith.

The base block with its electrical fittings is secured in a case 13 having a perforate cover 14 and an outlet 15.

In the preferred form an ordinary talking machine reproducer or sound box 16 is secured in the outlet 15 by a set screw 17 and has the customary diaphragm 18, needle arm 19 and stylus 20.

The needle arm 19 is connected with one end of the arm 8 by a bar 21 of any suit-

able, though preferably cushioning, material and the pressure on the arm 8 is regulated by slipping the sound box 16 in or out of the tube 15 and locking it in proper position.

To balance the pressure of the bar 21 on the arm 8 a spring 22 is secured to the case 1 and bears on the other end of the arm 8 with a piece of rubber or other cushioning material 23 between it and the arm.

The sound box 16 is shown as the preferred form of connection between the electrical mechanism and the record for the reason that a mouth piece or horn 24 may be slipped thereon and verbal announcements made over the circuit but it is obvious that other forms of mechanical connection between the record and electrical device may be employed.

The sound outlet of the sound box, when used, should be free and unrestricted to avoid muffling of the sound and for the same reason the cover of the outer case is perforated.

In use the apparatus is connected up as shown in Fig. 4. *a* is the transmitter of Figs. 1, 2 and 3. *b* is a boost coil having two primary and one secondary windings. *c* is a telephone receiver with an amplifying horn. *d* the battery or other source of electricity and *e* a variable resistance.

The wires 11, 11' are connected with one end of each primary winding of the boost coil. 12 is connected with both of the opposite ends of the primary windings on the coil through the battery and resistance. 25 and 25' connect the ends of the secondary winding with the receiver.

When the stylus 20 is in contact with a sound record it is apparent that arm 8 will rock in exact accordance with the engraved sound waves compressing and relieving the carbon in the cups and setting up fluctuations in the line wires and in the primary windings of the coil in turn affecting the secondary winding and the receiver thus reproducing the record loudly and naturally. By the use of this appliance it is possible to have the sound record and transmission element at the picture projecting machine with both under the absolute control of a single operator and to reproduce the sound at the picture screen adding greatly to the illusion.

The operator may listen to the reproduction through the small horn 24 and if he desires may make announcements to the audi-

ence by talking into the horn 24. In order that the record reproduction may be modulated as to volume the resistance e may be utilized enabling a musically inclined operator to properly interpret the record, which for technical reasons, is generally recorded at constant volume.

I claim:—

Phonic apparatus comprising a base block, insulation cups therein, a common cover arm for the cups pivotally secured to the base block, conducting material within the cups, conducting top and bottom linings in each cup, the top ones being secured to

the ends of the arm, electrical conductors from the top and bottom linings, a stylus bar having a stylus adapted to engage a sound record operatively connected to one end of the arm and a balance spring secured to the base block and bearing on the opposite end of the arm whereby equilibrium is maintained.

In testimony whereof I have affixed my signature in presence of two witnesses.

STEPHEN C. PORTER.

Witnesses:

ROBT. B. KILLGORE,
MAY M. LIPP.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

GRAPHOPHONIC AND OTHER DISK RECORD HOLDER.

1,242,550 ----- J. Heitman.
Patented October 9, 1917.
Filed July 3, 1915.

J. HEITMAN.
 GRAPHOPHONE AND OTHER DISK RECORD HOLDER.
 APPLICATION FILED JULY 3, 1915.

1,242,550.

Patented Oct. 9, 1917.

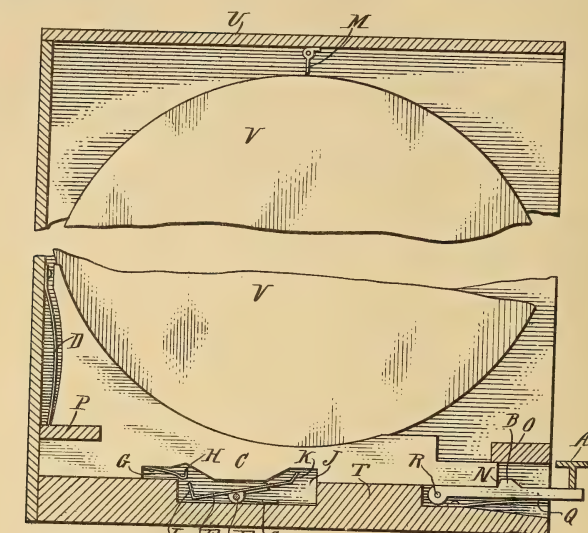
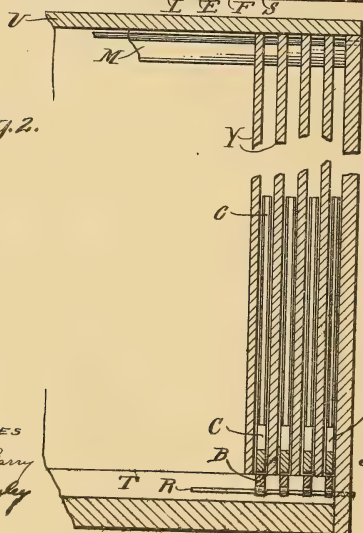


Fig. 1.

Fig. 2.



WITNESSES
 F. C. Barry
 L. A. Stanley

Inventor:
 John Heitman
 BY *Miner Geo.*
 Attorneys

UNITED STATES PATENT OFFICE.

JOHN HEITMAN, OF NOME, TERRITORY OF ALASKA, ASSIGNOR OF ONE-HALF TO
RALPH LOMEN, OF NOME, TERRITORY OF ALASKA.

GRAPHOPHONE AND OTHER DISK RECORD HOLDER.

1,242,550.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed July 3, 1915. Serial No. 37,911.

To all whom it may concern:

Be it known that I, JOHN HEITMAN, a subject of the King of England, residing at Nome, Alaska, have invented certain new and useful Improvements in Graphophone and other Disk Record Holders, of which the following is a specification, reference being had to accompanying drawings in which—

Figure 1 is a transverse sectional upright broken view, through one of the stalls and with record in place, of the body and working parts of the record holder; Fig. 2, a longitudinal sectional upright broken view of part of the record holder showing a number of partitions and record carriers. Stop M is shown swingably attached. In the drawings similar letters of reference are employed to indicate corresponding parts in the several views.

My invention relates to improvements in graphophone and other disk record holders as an article of manufacture and consists in the construction, in combination, of its parts as a record holder, the object and nature of which is to supply and provide a record holder in which the graphophone or other disk records may be compactly and securely stored and kept, by which the removal of more than one record at a time is prevented, and in which a record, once removed, must be replaced before another record can be taken out and in which also there are numbered or lettered keys on triggers by which to unlock the record carriers and facilitating the indexing and finding of each record in the record holder.

It consists of a body, case or cabinet, with vertical partitions forming stalls for the records, a record carrier in each stall, and means for locking and releasing any carrier whereby the record, resting on its carrier, is held in place or brought out of the record holder.

I construct my record holder as follows, reference being had to the drawings, in which T represents the bottom of the body, frame or case; Y thin vertical partitions spaced to form stalls of suitable width for the insertion of records; C represents thin record carriers, each slidably mounted and resting on the floor of the body between the partitions, each having its upper edge curved and grooved in part, to fit the periphery of a record or disk, and adapted to hold and

carry the record or disk in place or to and fro as hereinafter explained. O and P, respectively, represent guides, transversely and rigidly attached to the front and back of body and adapted to guide and hold the record carriers in horizontal position, the front end of the carriers being cut away to allow their sliding under the guide or cross-piece O, and the back of the carriers being slotted to allow them to slide under guide or cross-piece P. D represents a set of flat springs, each spring being disposed at and attached to the back of the body between partitions, and each spring working against the back of a record carrier, pressing forward the latter when not held in place by shoulder N, on trigger B. Trigger B is disposed underneath and in front of each carrier, room for same being made in the floor T; each trigger B is held in place by its axle R, and each trigger is actuated by a spring Q disposed underneath it. Each trigger is provided on its top with a projecting shoulder N, which holds the carrier in place until the trigger is pressed downward by pressure on its key A, mounted thereon. When trigger B is pressed down by pressure upon its key A, the carrier C, with its record V, is pushed forward by means of the spring D and the record can then be easily reached and removed from the record holder or cabinet. E represents a shallow and channel-like escapement disposed transversely to and full width of the body underneath the partitions and carriers in a recess in the floor T of the body; the edges of said escapement are bent upward to form the lips or pallets K and L, which latter are adapted to engage the carriers C in their forward or backward motion, as hereinafter explained. The escapement "E" oscillates on a rod or axle "F" rigidly disposed transversely the full width of and through the sides of the body, and is actuated by a record carrier "C" pressing against pallet "K" when such record carrier is moved forward, and is also actuated by a spring "S" underneath said escapement. The record carriers "C" have notches "G" and "J" on the underside. At notch "G" on each carrier is attached a spring "H" which, when a carrier is moved forward, acts as a lock or stop for all carriers except the carrier being operated or moved forward, the pallet "L" being thrown up in front of the spring "H," on all the

carriers, except the carrier being operated or moved forward and which latter carrier, in its forward movement, actuates the pallet "L" which thereby holds and locks the other carriers until the carrier moved forward is again moved back by the insertion of a record. M represents a stop slidably or swingably attached to the roof "U" of the body adapted to prevent the removal of the records or disks except the record or disk moved forward by pressure on trigger, as explained.

Records and disks may be placed in the record holder and securely locked therein by inserting the same in the vacant stalls between the partitions and by means of a record or disk pushing back the record carrier. Records and disks may be withdrawn from the record holder, one at a time, by pressing down on a key "A," of trigger "B," the latter acting against a spring "Q" on its under side, when shoulder "N" is released from the record carrier "C" and which latter, then, moves forward by reason of the spring "D," carrying with it the record sufficiently far beyond the face of the record holder to be easily grasped by the fingers and removed. In its forward motion the record carrier "C" engages with and forces down against its spring one edge or pallet "K" of the channel-like escapement "E" with the result that the other lip or pallet "L" rises into the recess or notch "G" in the carrier "C," thereby preventing further forward motion in "C." In the forward motion of record carrier "C" the projecting spring "H" passes over and beyond the pallet "L" before said pallet rises into the recess "G," but in all the other carriers the pallet "L" rises in front of the spring "H," arresting any forward motion of the latter carriers, until the carrier first moved forward, is pushed back into its place by the insertion of a record or disk. No record can be entirely inserted into the record holder until a key is pressed down and the record carrier "C" is in its out position, thereupon the record is placed on the curved and grooved upper edge of the carrier "C" and pushed back with "C" to the back of the record holder, until the key "A" and trigger "B," actuated by the spring "Q," rise, and the shoulder "N" arrests the forward movement of carrier "C," in front of it, and holds the latter in its closed or normal position. The face of the projection or shoulder "N" on trigger "B," sloping slightly, wedges record carrier "C" and insures that the spring "H" is carried far enough back from the pallet "L" so that it does not remain in contact therewith, or, by unnecessary friction, interfere with the free motion of the escapement "E." The object of the spring "H," with its bent projection, is to allow one or more of the carriers "C," with their ac-

companying records, to be pushed back to their normal position. The keys "A" may be numbered or lettered to correspond with some index so as to facilitate the identification of records.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a graphophone or disk record holder, in combination, a box-like body, a series of vertically disposed partitions therein, a series of partially curved and grooved record carriers slidably mounted between the partitions, a series of flat springs disposed at the back of the body between the partitions, each spring pressing upon the back of a record carrier, a series of triggers in front of the record carriers, each trigger adapted to hold or release a record carrier, substantially as described.

2. In a graphophone or disk record holder, in combination, a body, a series of vertically disposed partitions therein, a series of record carriers slidably mounted between the partitions, a series of springs attached to the back of the body, between the partitions, each spring pressing on the back of a record carrier, a series of triggers in front of the record carriers, each trigger adapted to hold or release a record carrier, a palletted escapement and means by which the record carrier and escapement engage each other, all substantially as described and for the uses and purposes mentioned.

3. In a phonograph disk record holder, a casing provided with a series of vertically disposed stalls or compartments, a slidable carrier disposed in each compartment and arranged to receive a record disk, means for projecting any one of said slidable carriers forwardly, and common means actuated by the forward movement of said projected carrier for locking the remaining carriers in position.

4. In a phonograph disk record holder, a casing provided with a series of vertically disposed stalls or compartments, a slidable carrier disposed in each compartment and arranged to receive a record disk, means for projecting any one of said slidable carriers forwardly, common means actuated by the forward movement of said projected carrier for locking the remaining carriers in position, and means for releasing said carriers operated by the return movement of the projected carrier.

5. In a phonograph disk record holder, a casing provided with a series of vertically disposed stalls or compartments, a slidable carrier disposed in each of said stalls, and arranged to receive a record disk, a spring for each carrier arranged to place the carrier under tension, a trigger for each carrier having an abutment to prevent the movement of the carrier, and a key for each trigger, the downward movement of the key

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causing the release of the carrier and its forward projection by said spring.

6. In a phonograph disk record holder, a casing provided with a series of vertically disposed stalls or compartments, a slidable carrier disposed in each of said stalls and arranged to receive a record disk, a spring for each carrier arranged to place the carrier under tension, a trigger for each carrier having an abutment to prevent the movement of the carrier, a key for each trigger, the downward movement of the key causing the release of the carrier and its forward projection by said spring, and means including an escapement for locking the remaining carriers in position.

7. In a phonograph disk record holder, a casing provided with a series of vertically disposed stalls, a slidable carrier disposed in each of said stalls, the upper portion of the carrier being curved to receive the record disk, each of said carriers being provided with a forwardly extending guide portion, a common guide member carried by the casing for guiding the forwardly extending portion of the carrier, a spring for each carrier normally pressing against the carrier, a trigger for each carrier having a beveled abutment arranged to engage the forwardly extending portion, an escapement common to all of said carriers, and means carried on each

carrier for operating said common escapement to lock the other carriers in position on movement of any one of said carriers.

8. In a phonograph disk record holder, a casing provided with a series of vertically disposed stalls, a slidable carrier disposed in each of said stalls, the upper portion of the carrier being curved to receive the record, each of said carriers being provided with a forwardly extending guide portion, a common guide member carried by the casing for guiding the forwardly extending portion of the carrier, a spring for each carrier normally pressing against the carrier, a trigger for each carrier having a beveled abutment arranged to engage the forwardly extending portion, an escapement common to all of said carriers, means carried on each carrier for operating said common escapement to lock the other carriers in position on movement of any one of said carriers, and a common guide member carried by the casing at the rear of said carriers for guiding any of said carriers in its forward or backward movement.

In witness whereof I have hereunto set my hand this 12th day of June, 1915.

JOHN HEITMAN.

In presence of—

GUDBRAND J. LOMEN,
RALPH LOMEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH RECORD CABINET.

1,242,563 ----- H.C. La Cor.
Patented October 9, 1917.
Filed May 2, 1916.

H. G. LA SOR.
 PHONOGRAPH RECORD CABINET.
 APPLICATION FILED MAY 2, 1916.

1,242,563.

Patented Oct. 9, 1917.

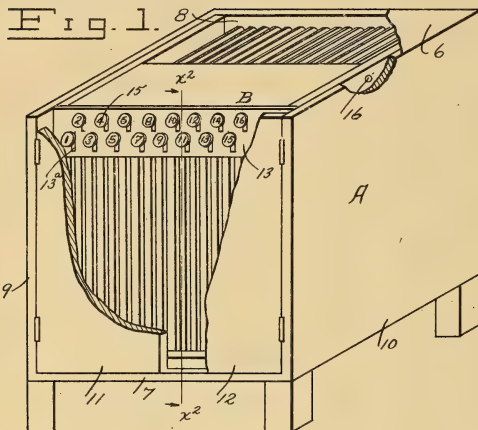


Fig. 4.

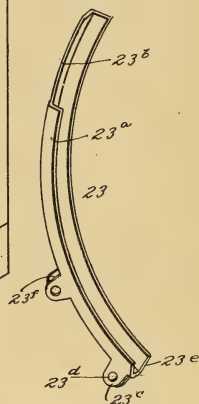


Fig. 2.

Fig. 3.

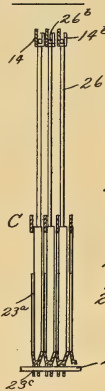
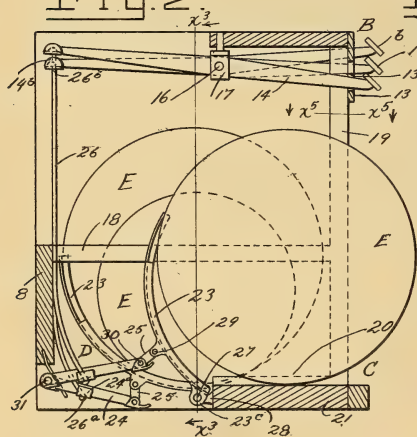
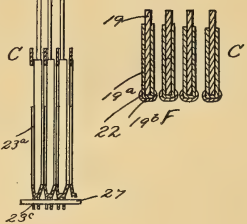


Fig. 5.



Witnesses,
 H. Gearing.
 Alfred H. Daehler. By *By Raymond W. Blocklee,*
 His Attorney.

UNITED STATES PATENT OFFICE.

HERBERT G. LA SOR, OF LOS ANGELES, CALIFORNIA.

PHONOGRAPH-RECORD CABINET.

1,242,563.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed May 2, 1916. Serial No. 94,911.

To all whom it may concern:

Be it known that I, HERBERT G. LA SOR, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Phonograph-Record Cabinets, of which the following is a specification.

This invention relates to phonograph record cabinets, and particularly to cabinets for the storage or housing of disk phonograph records, and the invention has for its object to provide a cabinet of the general nature stated in which disk phonograph records of all diameters up to the maximum for which any particular cabinet is designed may be conveniently placed, properly classified, and from which the same may be individually ejected or projected for use as desired.

A further object of the invention is to provide receiving and ejecting means for disk record cabinets, which will be relatively superior in point of inexpensiveness, simplicity in construction and compactness in form, positiveness and efficiency in operation, and freedom from liability to get out of repair or order, and convenience in use, and which will be generally superior in serviceability.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction, combination, association and relative arrangement of parts, members and features, all as hereinafter described, shown in the drawing, and finally pointed out in claims.

In the drawing:

Figure 1 is a fragmentary isometric view of a phonograph record cabinet, constructed and organized in accordance with the invention, parts being broken away for clearness of illustration;

Fig. 2 is an enlarged central vertical sectional view taken on the line x^2-x^2 , Fig. 1, and looking in the direction of the appended arrows;

Fig. 3 is a fragmentary sectional view taken on the line x^3-x^3 , Fig. 2, and looking in the direction of the appended arrows;

Fig. 4 is a still further enlarged isometric view of certain features shown in Figs. 2 and 3, the same being shown in detached position; and

Fig. 5 is an enlarged fragmentary detail horizontal sectional view taken on the line x^5-x^5 , Fig. 2, and looking in the direction of the appended arrows.

Corresponding parts in all of the figures are designated by the same reference characters.

Referring with particularity to the drawing, in the embodiment of the invention therein shown, A designates the casing of a disk record cabinet, B designates a keyboard, C designates spacing means for the records, D designates ejection means, E designates, in each instance, a phonographic record, and F designates retarding means for preventing complete ejection of the records.

The cabinet A may be formed of any suitable material and comprises a top wall 6, a bottom wall 7, a rear wall 8, side walls 9 and 10, and a plurality of doors 11 and 12 hinged, respectively, to the side walls 9 and 10.

The keyboard B preferably comprises a strip 13 ranging across the top portion of the cabinet from the side wall 9 to the side wall 10, and a plurality of keys b mounted on levers 14. Apertures 13^a are provided in the strip 13 through which the lever ends carrying the keys b project. Each of the keys b may consist of a disk 15 which may bear the number or name of the respective record controlled by the key. The levers 14 extend from the strip 13, at the front of the cabinet, to a point just forward of the rear wall 8 of the cabinet and are mounted immediately of their ends upon a common pivot 16 extending from side to side of the cabinet and serving as a fulcrum for all of the levers 14. The key-carrying ends of alternate levers are staggered to facilitate close grouping of the keys b . The pivot 16 may be supported from the top wall 6 of the cabinet, as by means of spaced brackets 17 depending from such top wall 6 and arranged between the levers 14.

The spacing means C preferably comprises a plurality of horizontal strips 18 of suitable material and each having one end supported at the rear wall 8 of the cabinet and the other end supported by a vertical strip 19 ranging from near the bottom wall 7 of the cabinet to the top wall 6 thereof, and a plurality of horizontal strips 20 register-

- ing with and connected to the vertical strips 19 near the bottom wall 7 of the cabinet and ranging inwardly a distance slightly less than half the depth of the cabinet.
- 5 These strips 20 are mounted in or on a suitable base block 21 lying on the bottom 7 of the cabinet and extending from the front thereof to the same distance rearwardly as the strips 20. Each of the strips 19 is partially sheathed in a textile material or the like as at 19^a and at its forward edge 19^b is provided with a relatively heavy woven or corded braid strip 22 which constitutes the retarding means F.
- 10 Each unit of the ejector means D comprises a curved sector 23 of channel section, shown as approximately a 90 degree segment of a circle, a link 24, a link 25, and a connecting rod 26. The curved sector 23 has one of its side walls 23^a cut away at the upper end as at 23^b and such end lies between the next adjacent strips 18 of the spacing means C. The other end of the sector 23 is provided with downwardly depending ears 23^c apertured as at 23^d to receive a rod 27 passed through all of the sectors 23 and constituting a pivot for the same. Such pivot may be supported in brackets 28 which may extend from the block 21 and in such position as to maintain the bottom wall 23^e of the sector adjacent to the inner end of the block 21 and slightly beneath the upper surface of such block, thus forming a step-off for the records when the sectors are in normal, record-receiving position.
- 35 The sector is provided with apertured ears 23^f intermediate its ends and the link 25 has one of its ends pivotally connected to such ears as by means of a pivot 29, the other end of the link 25 being pivoted to the forward end of the link 24 as at 30. The rearward end of the link 24 is mounted upon a rod 31 extending from side wall to side wall of the cabinet near the bottom and the rear wall thereof and constituting a pivot for all of such links 24. The connecting rod 26 has one end 26^a passed through and hooked in to an apertured projection 24^a formed on the link 24 intermediate its ends, and the other end 26^b of the rod 26 is passed through and hooked over an apertured projection 14^b one of which is provided on each of the levers 14 of the keyboard B at the rearward end of such lever.
- 55 It will be understood that an ejector unit comprising a curved sector 23 and attendant features, secured to a key lever 14 is provided for each record to be housed in the cabinet and that such segments are disposed, one in each of the spaces provided between adjacent spacing means strips 18, as well as one of such units being positioned between the side wall 9 and the next adjacent spacer strip 18 and another of such units disposed between the side wall 10 and the next adjacent spacer strip 18. It is also manifest that the cabinet may be designed to hold as many records as desired, by multiplication of the units and spacers and other attendant features. If desired, cabinets may be constructed with one tier of record holding and ejecting features superposed above another, all within a single casing, and without departing from the spirit of the invention.
- 75 The operation, method of use, and advantages of the improved phonographic record cabinet will be readily understood from the foregoing description, taken in connection with the accompanying drawing and the following statement:
- 80 A disk record may be placed in each of the spaces provided in the cabinet and the same will rest against the respective curved sector and with its center past the inner end of the block 21, such block preventing any tendency of the record to roll out of the cabinet. When it is desired to remove a record from the cabinet, the corresponding key *b* is depressed and the respective lever 14 through the respective connecting rod 26 raises the respective link 24 and the link connecting it to the sector, thus causing the tilting forwardly of the sector to eject the record. The retarding means F, acting as a drag against the sides of the record, will prevent the record from being projected completely out of the cabinet but allow the record to assume the position of one of the records shown in Fig. 2. When the record is in this position it may be easily removed. After the key *b* has been released the sector drops back to its normal position in the cabinet the key being raised by the drawing down of the connecting rod 26 when the sector falls by gravity.
- 105 Having thus disclosed my invention, I claim and desire to secure by Letters Patent:
1. In a device of the character disclosed, a casing, an arcuate holding and ejecting member pivotally mounted in said casing, and means for tilting said arcuate holding and ejecting member; said tilting means comprising a pair of links constituting a toggle, a pivoted lever having a key portion, and a connecting rod between said lever and said toggle; means being provided with which said member is pivotally connected and rearward of which the record is supported in engagement with said member and over which the record is rolled on the tilting of said member.
 2. In a device of the character disclosed, a casing, a plurality of separate ejecting members pivotally mounted in said casing, spacing means spanning the casing in a plane spaced from the region of the pivotal supports of said members and comprising spaced strips, and means for operating said ejecting members to discharge the records from the spaces between said strips; said

ejecting members being reduced in width at their outer end portions for reception between said strips whereby a minimum width of space is provided between said strips to accommodate the records and the total record-holding capacity of the casing is relatively increased.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

HERBERT G. LA SOR,

Witnesses:

ALFRED H. DAEHLER,
FRANCIS L. ISGRIGG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

the following is a list of the names of the persons who have been named in the preceding pages of this book.

THE NAMES OF THE PERSONS WHO HAVE BEEN NAMED IN THE PRECEDING PAGES OF THIS BOOK.

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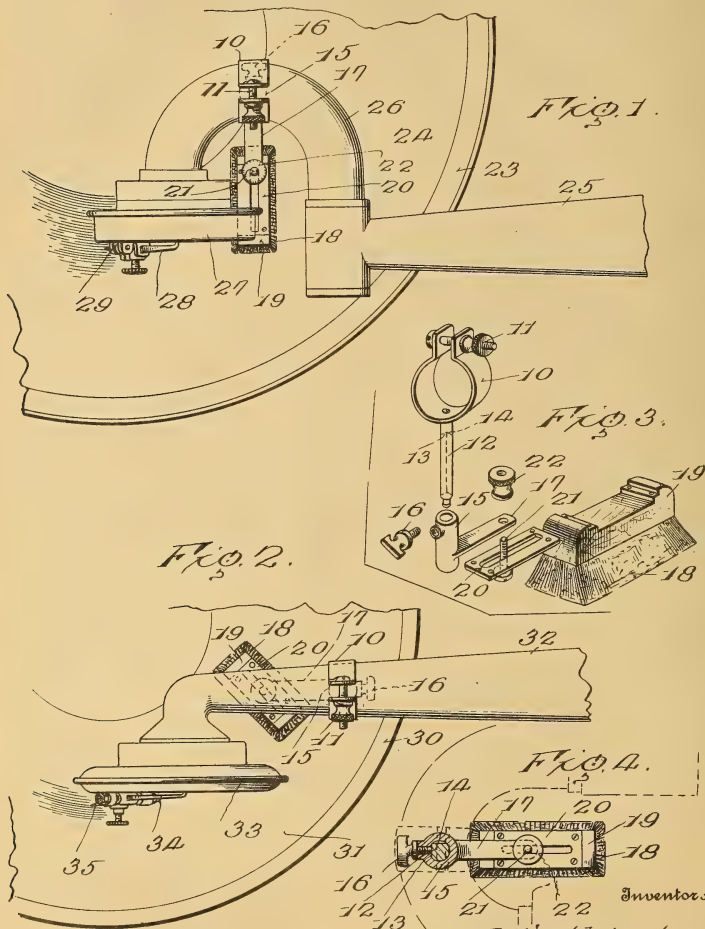
RECORD CLEANING ATTACHMENT FOR PHONOGRAPHS.

1,242,751 ----- J. & W. Worthington.
Patented ----- Oct. 9, 1917
Filed June 1, 1917.

J. & W. WORTHINGTON.
 RECORD CLEANING ATTACHMENT FOR PHONOGRAPHS.
 APPLICATION FILED JUNE 1, 1917.

1,242,751.

Patented Oct. 9, 1917.



By

J. Worthington
 W. Worthington
 Attorneys

UNITED STATES PATENT OFFICE.

JAMES WORTHINGTON AND WILLIAM WORTHINGTON, OF PLEASANT CITY, OHIO.

RECORD-CLEANING ATTACHMENT FOR PHONOGRAPHS.

1,242,751.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed June 1, 1917. Serial No. 172,287.

To all whom it may concern:

Be it known that we, JAMES WORTHINGTON and WILLIAM WORTHINGTON, subjects of the King of Great Britain, residing at Pleasant City, in the county of Guernsey and State of Ohio, have invented certain new and useful Improvements in Record-Cleaning Attachments for Phonographs, of which the following is a specification.

This invention relates to an improved record cleaning attachment for phonographs and has as its primary object to provide a device of this character which may be connected with the tone arm of the phonograph for brushing the record as it revolves and freeing the record of dust or other foreign matter before coming in contact with the phonograph needle.

The invention has as a further object to provide a device of this character which may be connected to a phonograph employing a goose-neck or crook in the tone arm for supporting the phonograph sound box or may be connected to a phonograph having a straight tone arm.

And the invention has as a still further object to provide an attachment of the above described character wherein the brush will be both longitudinally and rotatably adjustable so that the said brush may with facility be properly positioned with respect to the needle of the phonograph.

Other and incidental objects will appear as the description proceeds and in the drawings wherein we have illustrated the preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a plan view showing our improved attachment applied to a conventional type of phonograph employing a goose-neck or crook for supporting the sound box of the phonograph,

Fig. 2 is a similar view showing our improved attachment applied to a conventional type of phonograph employing a straight tone arm,

Fig. 3 is a detail perspective view showing the parts of the device disconnected, and

Fig. 4 is a detail plan view of the device.

In carrying out our invention, we employ a split attaching member or clip 10, the free ends of which are adjustably connected by a clamp screw 11. Depending from the lower side of the clip is a cylindrical shank or stem

12. This stem is, as particularly shown in Fig. 4, formed with angularly disposed flat faces 13 and 14 respectively. Mounted upon the stem 12 is a supporting member for the brush employed. This supporting member includes a sleeve 15 loosely fitted upon the stem 12 and equipped with a binding screw 16 adjustable for engaging the stem to hold the sleeve at slidable and rotatable adjustment upon the stem. Extending laterally from the sleeve is an arm 17. Supported by this arm is a brush or cleaning element 18. The brush is formed with a body 19 of wood or other approved material and this body is recessed or cut away to receive a plate 20 secured to the brush body by screws or other suitable fastening devices. The plate 20 is longitudinally slotted to freely receive a headed screw 21 arranged with the head thereof engaged with the lower side of the plate and received within the recess in the brush body 19. This screw is loosely fitted through the outer extremity of the arm 17 and receives a thumb nut 22 adjustable for clamping the brush in position.

In Fig. 1 of the drawings, we have shown our improved attachment applied to a conventional type of phonograph employing a goose-neck or crook for supporting the phonograph sound box. The phonograph includes the usual rotatable table 23 upon which is mounted a record 24. Arranged to swing across the table is the tone arm 25 to the outer extremity of which is swingingly connected a goose-neck or crook 26. Mounted upon the outer end of the goose-neck is the sound box 27 carrying the stylus bar 28 which is equipped with a needle 29. The clip 10 is first clamped by the clamp screw 11 about the goose-neck 26 at a point substantially midway the ends thereof with the stem 12 projecting downwardly from the goose-neck. The sleeve 15 of the brush supporting member is then adjusted upon the stem to a position with the arm 17 thereof extending laterally from the goose-neck in the direction of the sound box 27. When the sleeve is thus swung upon the stem 12, the clamp screw 16 will be brought opposite the flat face 14 of the stem to engage therewith for securely holding the brush supporting member at adjustment. After the brush supporting member has thus been fixed, the brush 18 may then be adjusted upon the arm 17 by means of the screw 21 to occupy a position, when the needle 29 is

rested upon the record 24, arranged in the rear of the needle to contact with the record. The vertical adjustment of the brush is of course obtained by properly positioning the sleeve 15 of the brush supporting member longitudinally upon the stem 12 while the lateral adjustment of the brush is obtained by sliding the screw 21 longitudinally within the slot of the plate 20. The brush may thus be readily positioned in the rear of the needle 29 to sweep the record and clean it of all dust or other foreign matter as the record is revolved upon the table 23. The necessity for the manual cleaning of the record before use is thus overcome.

In Fig. 2 of the drawings, we have illustrated our improved device attached to a conventional type of phonograph having a straight tone arm. In this figure, the table of the phonograph is indicated at 30 and mounted upon this table is the record 31. Arranged to swing across the table is the tone arm 32 upon the outer end of which is mounted the sound box 33. Carried by the sound box is the stylus 34 to which is connected the needle 35 for engagement with the record. In mounting the attachment, the clip 10 is first connected to the tone arm 32 in the rear of the sound box 33 with the stem 12 projecting beneath the tone arm. The sleeve 15 of the brush supporting member is then rotated upon the stem to a position with the arm 17 of the said member extending forwardly beneath the tone arm toward the sound box. With the arm thus disposed, the binding screw 16 upon the sleeve will be arranged to confront the flat face 13 of the stem 12 to engage therewith for rigidly holding the sleeve at adjustment. After the brush supporting member has been thus arranged in position, the brush 18 is adjusted longitudinally with respect to the arm 17 of the said member to occupy a proper position in the rear of the needle 35 to contact with the record 31. If desired, the brush may be further rotatably adjusted upon the arm 17 into angular relation to the tone arm 32 to assume a position with the length of the brush disposed radially of the axis of rotation of the record 31. By thus positioning the brush, the bristles thereof will more readily follow the grooves in the record for cleaning the record of all foreign matter as the record is revolved upon the table 30.

It will, therefore, be seen that we provide a particularly simple and efficient construc-

tion for the purpose set forth and an attachment having various adjustments to meet the different requirements of substantially any conventional type of phonograph.

Having thus described the invention, what is claimed as new is:

1. A device of the character described including an attaching member, a rotatably adjustable cleaning element supporting member slidably adjustable vertically upon said first mentioned member, and a cleaning element carried by the said last mentioned member.

2. A device of the character described including an attaching member, a cleaning element supporting member carried thereby, and a cleaning element carried by the said last mentioned member and slidably adjustable laterally thereon.

3. A device of the character described including an attaching member provided with a shank, a cleaning element supporting member adjustable longitudinally upon the shank, a cleaning element, and means slidably and rotatably connecting the said element with the said last mentioned member.

4. A device of the character described including an attaching member, a shank carried thereby, a sleeve vertically and rotatably adjustable upon the said shank and provided with a lateral arm, and a cleaning element carried by the said arm.

5. A device of the character described including an attaching member, a shank carried thereby, a cleaning element supporting member mounted upon the said shank and including an arm, a cleaning element including a body, a slotted plate carried by the body, and means fitted through the slot in said plate and engaged with the arm for rotatably and slidably connecting the cleaning element with the said arm.

6. A record cleaning attachment for phonographs including an attaching member connected with the phonograph tone arm, a cleaning element supporting member carried by said first mentioned member and adjustable thereon in a plane at right angles to the said arm, and a cleaning element carried by said last mentioned member and adjustable thereon to engage a record upon the phonograph for cleaning the record.

In testimony whereof we affix our signatures.

JAMES WORTHINGTON. [L. s.]
WILLIAM WORTHINGTON. [L. s.]

COMBINED PIANO AND GRAPHOPHONE.

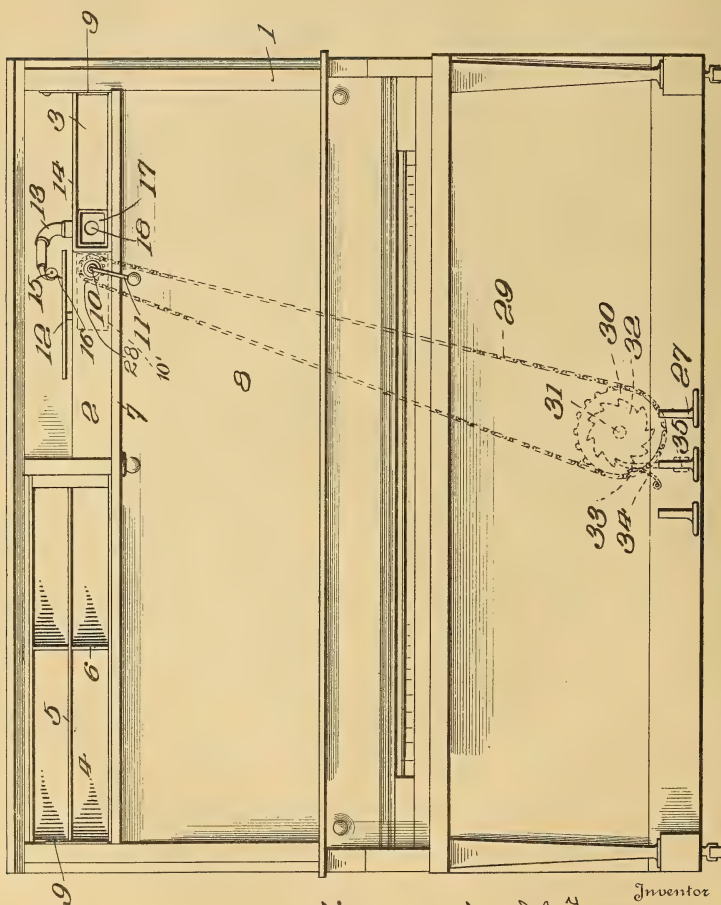
1,242,790 ----- J. J. Froess.
Patented October 9, 1917.
Filed Oct. 13, 1916.

J. J. FROESS,
COMBINED PIANO AND GRAPHOPHONE.
APPLICATION FILED OCT. 13, 1916.

1,242,790.

Patented Oct. 9, 1917.

2 SHEETS—SHEET 1.



Witnesses

Hoyd P. Cornwall.
Robt E. Barry.

J. J. Froess

By

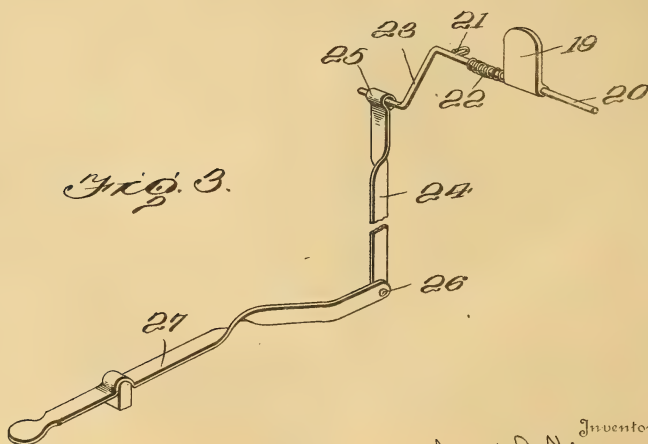
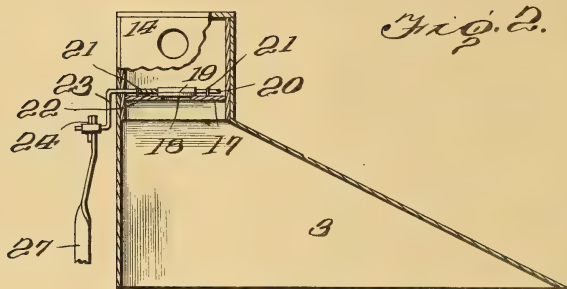
Jacob J. Froess
Attorney

Attorney

J. J. FROESS.
 COMBINED PIANO AND GRAPHOPHONE.
 APPLICATION FILED OCT. 13, 1916.

1,242,790.

Patented Oct. 9, 1917.
 2 SHEETS—SHEET 2.



Witnesses
 Lloyd P. Cornwall.
 Robt. Barry.

By

Inventor
 J. J. Froess
 W. H. H. H. H.

Attorney

UNITED STATES PATENT OFFICE.

JACOB J. FROESS, OF ERIE, PENNSYLVANIA.

COMBINED PIANO AND GRAPHOPHONE.

1,242,790.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed October 13, 1916. Serial No. 125,373.

To all whom it may concern:

Be it known that I, JACOB J. FROESS, citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Combined Pianos and Graphophones; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The principal object of my invention, is to so combine a piano and graphophone, that the piano may be used to accompany vocal selections or the like on the graphophone, as a matter of entertainment, and also as a matter of instruction for those who desire to practice an accompaniment to the vocal or instrumental music produced by the mechanism of the talking machine.

A further object of my invention is to provide mechanism for winding the graphophone motor shaft from the central pedal of the piano.

A still further object of my invention is to arrange mechanism within the piano case for connecting the forte pedal of the piano with the graphophone damper, so that the full tones of the graphophone may be heard when the forte pedal is depressed by the performer.

With the foregoing objects outlined and with other objects in view, which will become apparent, as the nature of the invention is better understood, the present invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed and without departing from the spirit of the invention or sacrificing any of its advantages.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings in which I have shown one form of my invention selected by me for purposes of illustration, and the said invention is fully disclosed in the following description and claims.

Referring to the drawings:—

Figure 1 is a front view of a manually operable piano having a graphophone and record cabinet mounted in the upper end of the piano case.

Fig. 2 is a detail horizontal sectional view of the graphophone horn and horn damper, which is controlled from the forte pedal of the piano.

Fig. 3 is a detail perspective showing the mechanism connecting the damper with the forte pedal.

In the drawings, 1 designates the case of an ordinary manually operable piano, provided within its upper end with a shelf (not shown) upon which rests a graphophone 2 having a horn 3 arranged alongside thereof, and a record cabinet 4 having a shelf 5 and a partition 6. A door 7 is hinged to the upper portion of the front board 8 of the piano case and supports 9 have their ends connected to said door and the sides of the piano case, for supporting said door in horizontal position after the same has been opened to expose the graphophone and record case.

The graphophone 2 is provided with an ordinary spring motor 10 which may be wound by a shaft 10 through the medium of a detachable crank 11, or by means of mechanism connected with the center pedal of the piano, which will be hereinafter described. An ordinary rotary record table 12 is suitably driven by the graphophone motor and a tone arm 13 is rotatably connected at one end to the top board 14 of the horn and is provided at its opposite end with a sound box 15 carrying a stylus 16 which coöperates with a record on the table 12, whereby the sounds are conducted to said horn.

The horn is preferably made of wood and is provided at its rear with a sound proof chamber, which is separated from the flaring portion of the horn by a vertical partition 17 having an opening 18 for the emission of the sounds from said chamber. This opening 18 provides the only outlet for the sounds from the sound proof chamber and it is normally tightly closed by a damper 19, which is rigidly carried by a rock shaft 20, that is freely mounted in bearings 21 upon the rear of said partition 17, and a coil spring 22 is connected to one of said bearings and to the shaft 20 for normally maintaining said damper in closed position. A crank 23 is rigid with the rock shaft and a link 24 has its upper end pivotally connected at 25 to said crank and its lower end pivotally connected at 26 to the rear end of the forte pedal 27 of the piano, so that the damper is opened each time the forte pedal

is depressed by the performer. It will, therefore, be apparent that the full tones of the graphophone and piano will be emitted simultaneously when the forte pedal is depressed.

In order to wind the graphophone motor from the center pedal of the piano, I have provided the graphophone shaft 10 with a rigidly connected sprocket wheel 28, connected by a sprocket chain 29 to a sprocket 30 rigidly carried by a shaft 31, mounted in bearings in the lower portion of the piano case for free rotary movement. The shaft 31 also carries a rigidly mounted ratchet 32, operated by a pawl 33, which is forced against the ratchet by a leaf spring 34, and is connected at its lower end to the central pedal 35 of the piano. By this construction, when the pedal 35 is operated by the foot of the performer, it raises the pawl 33 and causes the ratchet to turn the shaft 31, and with it the sprocket chain 29, so that the motor shaft 10 is turned to wind the graphophone motor.

From the foregoing, it will be apparent that I have provided an improved combined piano and graphophone, which may be operated separately or together, and I have arranged the graphophone within the piano in such manner that it will not detract from the appearance of the piano case.

What I claim and desire to secure by Letters Patent is:—

1. The combination with a piano, of a graphophone having a horn provided with a damper, and means for operating said damper from one of the piano pedals.

2. The combination with a piano, of a graphophone having a horn provided with a normally closed damper, and mechanism connecting said damper with the forte pedal of the piano, whereby the operation of said pedal will open said damper.

3. The combination with a piano, of a graphophone having a horn provided with a damper, a rock shaft having a crank upon

which the damper is rigidly mounted, and a link connecting said damper with the forte pedal of the piano.

4. The combination with a piano having a forte pedal, of a graphophone mounted in the piano case and provided with a horn having a partition provided with an opening, a rock shaft mounted in bearings in said horn and provided with a rigidly connected damper for closing said opening, a coiled spring connecting said shaft and one of said bearings, a crank provided upon said shaft, and a link connecting said crank and said forte pedal.

5. The combination with a piano, of a graphophone having a spring motor, a winding shaft for said motor, and winding means connecting said shaft with one of the piano pedals, whereby the pedal winds the spring of the motor.

6. The combination with a piano, of a graphophone having a spring motor, a winding shaft for said motor, a sprocket wheel mounted on said shaft, a pawl and ratchet mechanism connected to one of the piano pedals, a sprocket wheel operated by said pawl and ratchet mechanism, and a chain connecting said sprocket wheels for joint movement.

7. The combination with a manually operable piano, of a graphophone mounted in the piano case and provided with a spring motor, and mechanism connecting said motor with one of the piano pedals, whereby the operation of said pedal will wind said motor.

8. The combination with a piano having the usual soft and forte pedals, of a graphophone mounted in the piano case, and means connecting the graphophone with one of said pedals, whereby the volume of sound emitted by the graphophone may be controlled by said pedal.

In testimony whereof I affix my signature.

JACOB J. FROESS.

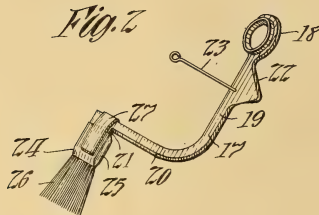
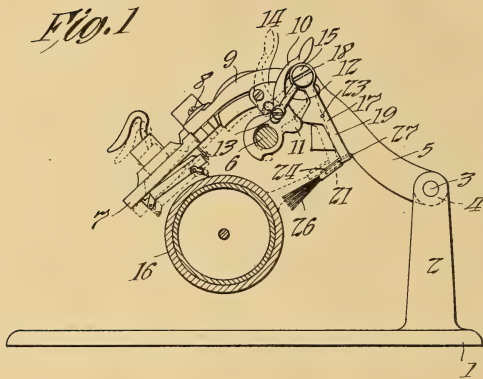
PHONOGRAPH.

1,242,858 ----- I. T. Pike.
Patented ----- Oct. 9, 1917.
Filed ----- May 10, 1913.

I. D. PIKE.
 PHONOGRAPH.
 APPLICATION FILED MAY 10, 1913.

1,242,858.

Patented Oct. 9, 1917.



Witnesses:

Wm. A. Hardy

William A. Hardy

Inventor:

Irwine D. Pike

by Ryer & Holden

his Atty.

UNITED STATES PATENT OFFICE.

IRWIN D. PIKE, OF WEST ORANGE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PHONOGRAPH.

1,242,858.

Specification of Letters Patent.

Patented Oct. 9, 1917.

Application filed May 10, 1913. Serial No. 766,697.

To all whom it may concern:

Be it known that I, IRWIN D. PIKE, a citizen of the United States, and a resident of West Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Phonographs, of which the following is a description.

My invention relates to phonographs and more particularly to an improved cleaning device which, while it is adapted to be applied to numerous types of phonographs, is especially designed for application to Edison phonographs employed for commercial purposes.

The principal object of my invention is to provide an improved construction whereby it will be insured that the cleaning material of the cleaning device will be maintained in contact with the record or blank when the reproducer or recorder of the phonograph is in operative position and will be removed from such contact when the reproducer or recorder is moved from operative position. My invention also contemplates the provision of a simple and improved cleaning device which may be made as an attachment; and the provision of an improved brush which forms a part of the cleaning device and which may also be made as an attachment capable of being readily applied to and removed from the rest of the cleaning device, whereby, when the cleaning material of the brush becomes worn, the latter may be quickly replaced.

Other objects of my invention reside in the construction of parts and combinations of elements hereinafter more specifically described and set forth in the appended claims.

In order that my invention may be more clearly understood, reference is made to the accompanying drawings forming a part of this specification and in which—

Figure 1 is an end elevation, partly in section, of a phonograph showing one form of my improved cleaning device applied thereto, parts of the phonograph being omitted; and

Fig. 2 is a view in perspective of the cleaning device detached.

Referring to the drawings, reference character 1 represents the base plate of a phonograph which is provided with a standard 2, carrying at its upper end the usual back rod 3. A sleeve 4 is rotatably mounted on the back rod 3 and is secured to the carrier

arm 5, preferably being integral therewith.

Reference character 6 represents the stationary front guide rod which is adapted to support the forward end of the carrier arm 5. The arm 5 is provided with the usual

feed nut (not shown) which is adapted to engage and disengage a feed screw (not shown) when the arm 5 is lowered and raised. A spectacle frame 7 for carrying the recorder and reproducer is pivotally mounted on a stud 8 carried by the auxiliary arm 9, which arm is pivoted on a bearing carried by the carrier arm 5 adjacent the forward end thereof. Reference character 10 represents the lifting lever which is preferably rotatably and slidably mounted upon the forward guide rod 6, this lever preferably being provided with a passage-way through the lower end thereof through which the said guide rod passes. The lifting lever is preferably provided with a projection or cam portion 11, the function of which will be hereinafter described. A link 12 is pivotally connected at one end to lever 10 as by means of a screw or pin 13, and is pivotally connected at its other end to the carrier arm 5, the latter end being preferably mounted on the bearing on which the auxiliary arm 9 is pivoted. Link 12 is mounted for free rotation about pin 13 and the bearing therefor on arm 5. By this construction a toggle joint is provided, the central point of which is the pin 13, and the two arms are the link 12 and the portion of the lever 10 between rod 6 and the pin 13 respectively. By forcing the lever 10 to the right, the toggle is straightened out and the carrier arm raised, the stylus of the recorder or reproducer being raised out of its engagement with the record or blank 16; while by movement of the lever to the left the toggle is opened out and the stylus of the recorder or reproducer lowered into engagement with the record or blank. Movement of the lever 10 to the right and left is limited by a suitable bracket 14 suitably secured to carrier arm 5, which bracket is provided with suitable projections adapted to coöperate with a pin (not shown) on the lifting lever 10 for this purpose. Suitable means such as a screw 15 is provided for holding the link 12 on its bearing on carrier arm 5. The structure generally described above is the same as that disclosed in Patent No. 1,023,250, granted April 16,

1910

1912 to Charles L. Hibbard, to which reference is made for a more detailed description.

When a machine such as described above is used for recording, the chips accumulate upon the recording blank and interfere with the stylus, thereby preventing the best results from being obtained. The chips and fine wax-like material are also liable to blow about the room and upon the dictator's clothes. Also, when the machine is used for reproducing, any dust or dirt which may have collected in the record grooves of a record will interfere with the reproducing stylus and impair the reproduction. Accordingly, I have devised an improved cleaning device adapted to be attached to machines such as the one herein described, for obviating the above objections. The cleaning device is designated generally by reference character 17 and comprises a light arm, of suitable metal, provided at one end with a hub or bearing 18. Intermediate its ends the arm is bent, whereby two substantially straight portions 19 and 20 substantially at right angles are provided. The end of the arm opposite bearing 18 is provided with a projection or tab 21, preferably formed integrally therewith, for supporting the brush. The straight portion 19 is provided intermediate its ends with a cam portion 22 and a spring 23, the latter preferably being in the form of a fine straight spring wire secured at one end to the arm and extends substantially at right angles therefrom. The brush is designated generally by reference character 24 and preferably comprises a metallic tubular member or ferrule 25, within one end portion of which the cleaning material 26, preferably of camel's-hair, is tightly held by compressing the material of the said end portion. The other end portion of the tubular portion 25 is adapted to be slipped over the tab 21 to frictionally engage the same to hold the brush on the arm 17 in the position shown. To further insure that the brush will be held in place on arm 17, the ferrule 25 may be provided with a spring piece or clip 27 secured thereto or formed integrally therewith. Clip 27 extends longitudinally of ferrule 25 and its free end portion is bent inwardly to occupy a position in line with the opening of the ferrule. It will be apparent that on slipping the ferrule onto the tab or projection 21, the end of clip 27 will spring over that edge of portion 20 of arm 17 opposite the tab 21 and thereby hold the brush in the position shown. Ferrule 25, however, may be made to fit tab 21 so tightly as to render the use of the clip 27 unnecessary, in which case the latter is omitted. When the bristles of brush 24 become worn, the brush may be readily and quickly removed from arm 17 and replaced by a new one.

Referring to Fig. 1, the cleaning device is applied to the phonograph by removing screw 15 and the upper end of link 12 from the bearing for the latter on carrier arm 5 and slipping hub 18 of the cleaning device over this bearing and then replacing the end of link 12 and screw 15 in the positions shown. While the arm 17 is designed to rotate freely about its pivotal connection with the carrier arm 5 and gravity tends to force it toward the position shown in dotted lines in Fig. 1, with the cleaning material in engagement with the record or blank 16, the spring 23 bearing against the under side of carrier arm 5, cooperates with the latter to insure that the brush will be brought into operative position with the cleaning material 26 thereof held in contact with the record or blank 16 under a light pressure when the recorder or reproducer is in operative position.

When lever 10 is turned to the right to the position shown in full lines in Fig. 1 to straighten out the toggle and thereby move the auxiliary arm 9 to carry the sound box, either the reproducer or recorder to inoperative position, the cam 11 on lever 10 will engage the cam 22 on arm 17 and act to raise the latter in opposition to the action of spring 23 and thereby move the cleaning material 26 from contact with the record or blank 16. When the toggle is opened by moving lever 10 to the left, the parts of the phonograph will assume the positions shown in dotted lines with the stylus of the reproducer or recorder in engagement with the record or blank 16, and gravity and the spring 23 coacting with carrier arm 5 will force the arm 17 to operative position with the cleaning material 26 of the brush in engagement with the record or blank 16.

The term "sound box" where used in the specification and claims is intended to denote either a reproducer or recorder.

While I have shown my improved cleaning device applied to a special type of phonograph, it is, of course, understood that it is applicable to many other types. It will also be understood that my invention may be embodied in many forms other than the one herein shown without departing from the spirit of my invention and the scope of the claims.

Having now described my invention, what I claim and desire to protect by Letters Patent is:—

1. As a new article of manufacture, a cleaning device for phonographs comprising an arm provided with a bearing at one end for connecting the same to a part of the phonograph, a brush at its other end, and a spring intermediate its ends, substantially as described.

2. As a new article of manufacture, a cleaning device for phonographs comprising

an arm provided with a bearing at one end for connecting the same to a part of the phonograph, a brush at its other end, and a cam intermediate said ends, substantially as described.

3. As a new article of manufacture, a cleaning device for phonographs comprising an arm provided with a bearing at one end for connecting the same to a part of the phonograph, a brush at its other end, and a cam and a spring intermediate its ends, substantially as described.

4. As a new article of manufacture, a cleaning device for phonographs comprising an arm adapted to be pivotally connected at one end to a part of the phonograph, a brush secured to the other end of said arm and means constantly tending to move said arm about its pivot and the brush toward operative position when said arm is so connected to the phonograph, substantially as described.

5. A brush for phonographs, comprising cleaning material and attaching means for connecting the brush to a brush carrying element adapted to be mounted on the phonograph, consisting of a member to one end portion of which the cleaning material is secured, the other end portion thereof being adapted to be applied to the brush carrying element, and means secured to said member and adapted to coact with said element when the member is applied thereto to automatically lock the brush to said member in a predetermined position with respect thereto and in frictional engagement therewith, substantially as described.

6. A brush for phonographs, comprising cleaning material, and attaching means for connecting the brush to a brush carrying element adapted to be mounted on the phonograph, consisting of a member to one end portion of which the cleaning material is secured, the other end portion thereof being adapted to be applied to the brush carrying element, and resilient means secured to said member and adapted to coact with said element when the member is applied thereto to automatically and yieldingly lock said member to said element in a predetermined position with respect thereto, substantially as described.

7. A brush for phonographs comprising cleaning material, and attaching means for connecting the brush to a brush carrying member adapted to be mounted on the phonograph consisting of a hollow ferrule or tubular member within one end portion of which the cleaning material is secured and the other end portion of which is adapted to be slipped on the brush carrying member, and a spring clip fixed at one end to the ferrule and extending beyond one end thereof, the free end portion of the spring clip normally occupying a position in line with the

opening or passageway of the ferrule or tubular member, substantially as described.

8. In a phonograph, the combination with a rotatable support, a movable supporting member carrying a sound box, and means for controlling the movement of said supporting member to carry the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device biased to operative position with the cleaning material thereof in engagement with a record or blank on said support and operable by said controlling means to be moved with respect to the sound box and into inoperative position when the sound box is moved from operative position, substantially as described.

9. In a phonograph, the combination with a rotatable support, a sound box and means for controlling the movement of the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device movable automatically with respect to the sound box into operative position with the cleaning material thereof in engagement with a record or blank on said support when the sound box is brought to operative position, said cleaning device being operable by said controlling means to be moved with respect to the sound box into inoperative position when the sound box is moved from operative position, substantially as described.

10. In a phonograph, the combination with a rotatable support, a sound box and means for controlling the movement of the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device provided with resilient means coöperating with a part of the phonograph and adapted to automatically bring said device into operative position with the cleaning material thereof in engagement with a record or blank on said support when the sound box is in operative position, said cleaning device being operable by said controlling means to be moved into inoperative position when the sound box is moved from operative position, substantially as described.

11. In a phonograph, the combination with a rotatable support, a sound box and means for controlling the movement of the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device pivotally connected with a part of the phonograph and movable automatically about its pivot into operative position with the cleaning material thereof in engagement with a record or blank on said support when the sound box is brought to operative position, said cleaning device being operable by said controlling means to be moved into inoperative position when the sound box is moved from

operative position, substantially as described.

12. In a phonograph, the combination with a rotatable support, a sound box and means comprising an actuating member for controlling and effecting the movement of the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device always tending to assume operative position with the cleaning material thereof in engagement with a record or blank on said support, said cleaning device being provided with means adapted to coact with said actuating member to effect movement of said cleaning device with respect to the sound box to inoperative position when the actuating member is operated to effect the movement of the sound box from operative position, substantially as described.

13. In a phonograph, the combination with a rotatable support, a sound box and means comprising an actuating member for controlling and effecting the movement of the sound box into and out of operation position with respect to a record or blank on said support, of a cleaning device always tending to assume operative position with the cleaning material thereof in engagement with a record or blank on said support, said actuating member and cleaning device being provided with coacting means comprising a cam adapted to effect the movement of said cleaning device to inoperative position when the actuating member is operated to effect the movement of the sound box from operative position, substantially as described.

14. In a phonograph, the combination with a rotatable support, a sound box and means comprising an actuating member pivotally mounted on a fixed part of the phonograph for controlling and effecting the movement of the sound box into and out of operative position with respect to a record or blank on said support, of a pivotally mounted cleaning device always tending to assume operative position with the cleaning material thereof in engagement with a record or blank on said support, said cleaning device

being provided with means adapted to coact directly with said actuating member to effect movement of said cleaning device with respect to the sound box to inoperative position when the actuating member is operated to effect the movement of the sound box from operative position, substantially as described.

15. In a phonograph, the combination with a rotatable support, a sound box and means comprising an actuating member for controlling and effecting the movement of the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device pivotally mounted on a part of the phonograph and always tending to assume operative position with the cleaning material thereof in engagement with a record or blank on said support, said cleaning device being provided with a cam adapted to coact with said actuating member to effect the movement of said cleaning device to inoperative position when the actuating member is operated to effect the movement of the sound box from operative position, substantially as described.

16. In a phonograph, the combination with a rotatable support, a movable supporting member carrying a sound box, and means for controlling the movement of said supporting member to carry the sound box into and out of operative position with respect to a record or blank on said support, of a cleaning device pivotally mounted on said movable supporting member and provided with means cooperating with a part of the phonograph always tending to hold the same in operative position with the cleaning material thereof in engagement with a record or blank on said support, said cleaning device being operable by said controlling means to be moved into inoperative position when the sound box is moved from operative position, substantially as described.

This specification signed and witnessed this 8th day of May 1913.

IRWIN D. PIKE.

Witnesses:

WILLIAM A. HARDY,
MARY J. LAIDLAW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

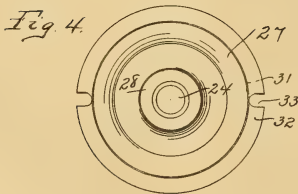
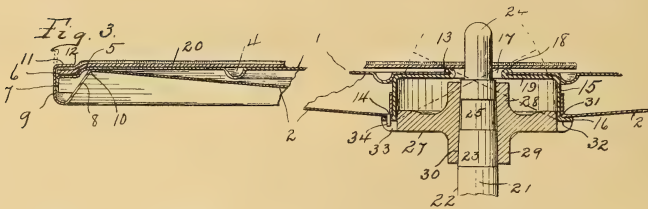
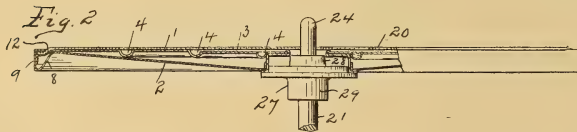
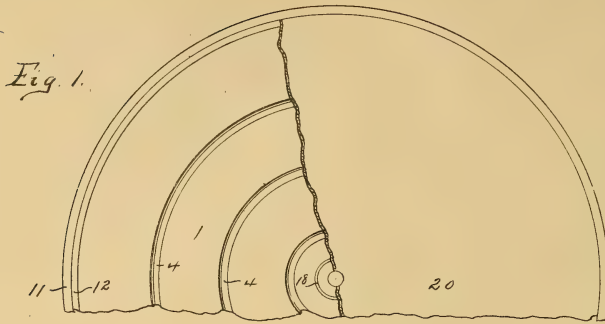
TABLET SUPPORT FOR TALKING MACHINES.

1,242,920 ----- P. Catucci,
Patented Oct. 16, 1917.
Filed Mar. 13, 1917.

P. CATUCCI.
 TABLET SUPPORT FOR TALKING MACHINES.
 APPLICATION FILED MAR. 13, 1917.

1,242,920.

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 2 SHEETS—SHEET 1.



Pliny Catucci INVENTOR.

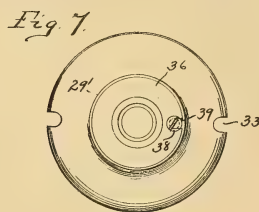
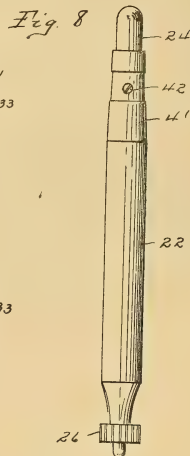
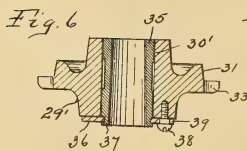
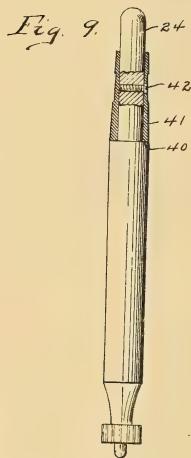
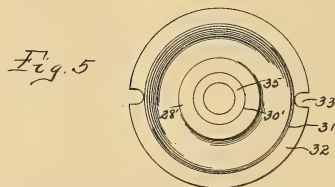
BY

Louis M. Sanders ATTORNEYS.

P. CATUCCI,
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 2 SHEETS—SHEET 2.



Pliny Catucci INVENTOR.

BY
Louis M. Sanders ATTORNEYS.

UNITED STATES PATENT OFFICE.

PLINY CATUCCI, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO OTTO HEINEMAN PHONOGRAPH SUPPLY CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TABLET-SUPPORT FOR TALKING-MACHINES.

1,242,920.

Specification of Letters Patent.

Patented Oct. 16, 1917.

Application filed March 13, 1917. Serial No. 154,527.

To all whom it may concern:

Be it known that I, PLINY CATUCCI, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Tablet-Supports for Talking-Machines, of which the following is a specification.

In my prior Patent No. 1,128,756, dated Feb. 16, 1915, I have fully and clearly set forth the advantages of a tablet support constructed with a plain or flat disk, strengthened by a dished or flattened, cone-shape disk, the margin of which is rigidly secured to the flat disk. In practice it is the custom to place a circular sheet of felt upon the upper surface of such a tablet support, either permitting the same to rest loosely upon such support, or securing the same in place by the use of some adhesive. The use of felt for the purpose has become universal for the reason that when used in either of the ways just described, there is no tendency to ravel or fray at the margin of the sheet of felt. Should any other fabric be used for the purpose, it would be necessary either to hem the margin of the sheet or bind it with other material to prevent its fraying or raveling. The felt possesses the disadvantage of distortion upon the accumulation of moisture, either accidentally or from the moist condition of the atmosphere, so that it frequently happens that the felt sheet must be replaced.

It is well known that a pile fabric such as velvet or plush is more suitable for the purpose than felt; but hitherto, because of the tendency of velvet or plush to ravel and fray at the margin, it has not been used.

One of the objects therefore, of my present improvement is to provide means upon the tablet support for firmly securing the margin of a pile fabric sheet upon the upper surface of the support without the necessity of a marginal binding or hem.

It is also desirable in practice to provide means whereby the tablet support may be readily removed from the driving spindle or mandrel. In my prior patent referred to, I have described a central thimble which is rigidly secured to the disks forming the elements of the tablet support, such thimble being provided with a central aperture which nicely fits over the spindle. The

difficulty with such a construction in practice is that because of the mandrel itself, being slightly tapered, such thimble frequently becomes fixed or set upon the mandrel, so as to require considerable effort to remove the same. I have found in practice that such a close fit between the mandrel to the tablet support is unnecessary, and what I term a floating fit is much more desirable for the reason that it permits the ready removal of the tablet support from the spindle and at the same time it avoids the liability of binding or distorting the spindle accidentally, through any undue weight or pressure to which the tablet support itself may be subjected. The tablet support is usually twelve inches in diameter, and if fitted firmly in place upon the spindle, any knock or jar at the circumference of the tablet support will necessarily subject the spindle to an enormous strain and consequent distortion so that, thereafter, the tablet support will not run true. A further object in my present invention is therefore to provide means for a floating fit between the tablet support and the spindle.

Other objects and advantages are fully set forth in the accompanying specification.

In carrying out the objects of my invention I make use of the structures described in the following specification and illustrated in the accompanying drawings, wherein—

Figure 1 is a top-plan view of my improved tablet support.

Fig. 2 is a side elevation, partly in section.

Fig. 3 is an enlarged sectional view showing the details of the construction.

Fig. 4 is a plan view of the center bearing and spindle with the tablet support removed.

Fig. 5 is a plan view of a modified form of center bearing.

Fig. 6 is a vertical section and

Fig. 7 is a bottom plan of said modification.

Fig. 8 is a side elevation of a spindle.

Fig. 9 is a similar view, partly in section, of said spindle.

Similar reference numerals refer to like parts throughout the specification and drawings.

The tablet support, or as it is sometimes called, the turntable is constructed of the

upper and lower sheet metal disks, 1, and 2. The upper disk 1, is substantially flat but may be provided with a central depression as at 3. It may also be provided with a series of annular beads or single corruga-
 5 tions 4, if desired, to strengthen the disk, which is ordinarily made of a very thin sheet metal as steel or brass. Near the margin, the disk is curved downwardly as at 5, and
 10 then extends outwardly as at 6, and the extreme edge is turned downwardly at right angles to the plane of the disk, so as to form the marginal flange 7.

The lower disk 2, is dished or formed into a flattened inverted cone. Near the margin
 15 it is turned downwardly and outwardly as at 8, and then upwardly as at 9. In this condition the two disks 1, and 2, are fitted together with the flange 7, inside of the up-
 20 turned part 9, and with curved part 10, bearing upon the under face of the disk 1. The extreme edge of the upturned edge 9, is then spun down as at 11, so as to form, with the annular part 12, of the disk 1, the annular
 25 recess 12.

The two disks 1, and 2, are centrally apertured as at 13, and 14, respectively, to receive the central inverted cup-shaped thimble 15, the marginal flange 16, of which
 30 bears upon the lower side of the disk 2. The thimble 15, is centrally apertured as at 17, with the margin of such aperture spun over the margin of the aperture 13, as at 18, with the broad flat bottom 19, of the thimble
 35 15, in contact with the lower face of the upper disk 1. Thus the two disks 1, and 2, are firmly united together, and because of their peculiar construction and light weight, they form a tablet support more rigid than
 40 the usual single disk of heavier material.

A disk 20 of some pile fabric, as velvet or plush, of the same diameter as the tablet support may now be laid before the upper
 45 disk 1, and its margin may be readily inserted into the annular recess 12, where it will be protected from wear, and liability to fray or ravel. If desired, the fabric disk
 50 20, may be more firmly fixed in place, by the application of some adhesive, as glue or cement to the upper disk 1, before placing the fabric disk 20, thereon. I may also connect the two disks 1, and 2, together with the
 55 thimble 15, before spinning down the margin 11. The fabric disk 20, may there be put in place and the margin 11, may be spun down so as to firmly clamp the margin of the disk 20, in place. I do not consider these
 60 various ways of fixing the fabric disk in place as modifications, but rather varying means to suit the wishes of the user.

The driving mandrel or spindle 21, may be of the usual type or of the preferred construction hereinafter described. In any
 65 case, it is of the standard external shape and contour as shown; the main body is cylin-

dricial as at 22, with the slightly tapered portion 23, and the cylindrical end 24. In order to reduce the extent of its bearing surface with the center bearing the tapered
 70 portion 23, may be relieved as at 25. The lower end of the spindle is provided with a pinion 26, for engagement with a driving gear (not shown) by which the spindle is rotated.

The center bearing 27, consists of a small circular casting provided with the upper and lower bosses 28, and 29, through which extends the aperture 30, tapered to fit the tapered portion 23, of the spindle. Near the margin of the casting I provide the annular
 75 shoulder 31, of a diameter slightly less than the internal diameter of the thimble 15. This leaves a narrow supporting flange 32, upon the margin of the casting upon which the marginal flange 16, of the thimble may
 80 rest. I may provide the flange 32, with the open slots 33, to receive the pin 34, which projects downwardly from the flange 16, so as to insure proper rotation of the tablet support. Ordinarily this slot and pin connection is unnecessary, as the friction of the
 85 parts is sufficient to insure their rotation together. It will be noted that the shoulder 31, tapers slightly. In practice, it is made slightly conoidal, with the center of curva-
 90 ture at the base of the shoulder and diametrically opposite, as shown diagrammatically in Fig. 3. Thus constructed, there is never any danger of the tablet support be-
 95 coming jammed or stuck upon the center bearing, while any abnormal pressure upon part of the tablet support will result only in tilting the tablet support and will not have any tendency to bend or distort the spindle. Moreover the construction de-
 100 scribed renders the removal of the tablet support only a matter of lifting it from the center bearing, with no parts to stick and bind. It might be thought that the weight
 105 of the sound box and tone arm when resting upon a record tablet near its circumference would be sufficient to tilt the tablet support, since it is so lightly supported upon the center bearing. This is not the case,
 110 however, for in practice, it is found that the tablet support and center-bearing will stay true, and "run truer," than the older forms where the tablet support is made of a single disk of pressed metal. I account
 115 for this by reason of the fact that such pressed metal tablet supports are subjected to varying internal strains, due to the method by which they are made, and varying temperatures. In the built up tablet support
 120 constructed as above described since the sheets or disks are so much lighter the internal strains are correspondingly lighter and the trussed form of the construction is such as to resist distortion from whatever
 125 cause.

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In Figs. 5, 6 and 7, I have shown a slightly modified form of center bearing. It is substantially the same in every respect as that shown in Figs. 2, 3 and 4, with the exception that the central aperture 30' is cylindrical and in it is inserted a bushing 35, having a tapering central bore to fit the tapered part of the mandrel. This bushing is held in place by means of a collar, 36, which is held in a groove 37, in the lower end of the bushing 35, so as to permit free rotation of the bushing within the collar. The collar itself is secured to the lower boss 29', by means of a screw 38. By removing screw 38, the collar 36, and the bushing 35, may be readily removed from the center bearing, and when worn out may be replaced by a new one. The external features of the center bearing are otherwise substantially the same as described in connection with the center bearing illustrated in Figs. 2, 3 and 4.

In Figs. 8, and 9, I have shown an improved mandrel or spindle. Such mandrels have been standardized as to size and shape so that in external contour they are substantially alike, the form being illustrated in Fig. 8. In practice however, the mandrel may be materially cheapened by using a lower grade of metal for the main body 22, and its spindle extension 24, which, as shown in Fig. 9, is merely a reduced diameter leaving a shoulder 40, upon cylindrical part of the mandrel. Secured to the spindle 24, is the sleeve 41, such sleeve being so made as to slip down to the shoulder 40, with a comparatively loose fit. The sleeve 41, may then be readily secured in place by means of the set screw 42, screwed diametrically through an enlarged hole in one wall of the sleeve and the body of the spindle end 24. This sleeve 41 is made of a higher grade of metal, usually hardened steel, and with it in place as shown in Fig. 9, the entire structure is exactly the same form and contour as the usual mandrel, being provided with the driving pinion 26, at the lower end and the center bearing supported at the upper end.

From the above description it will be noted that my improvements are directed to the means for supporting a record tablet upon a talking machine, and that such means are directed to the cheapening of manufacturing processes, while at the same time the general dimensions and forms of the parts are preserved in the table support. It is the practice among talking machine builders to plate the various exposed parts of the mechanism either with nickel, silver and very frequently with gold. The exposed parts of the tablet support will be the lower disk 2 with its flange members 8, 9 and 11. When this lower disk is made of thin brass it may be plated with gold much more readily and with better effect

than if it were made of the usual low grade cheap steel. It will also take a high finish when plated with silver or nickel.

From structure as described, and upon reference to Figs. 2 and 3, of the drawings, it will be noted that the upper face or surface of the fabric disk 20, is in a plane slightly above the plane of the marginal flange 11, so that when a record tablet rests upon fabric disk 20, its margin will never contact with the metal flange 11. The downward off-set of the recess 12, formed between the margin of the two disks 1 and 2, permits of this slight elevation of the upper surface of the fabric disk 20.

The entire structure of the tablet support possesses the required strength and stability, while the method of securing the margins of the upper and lower disks so as to provide the annular recess 12, makes it possible to use the most desirable pile fabric for the upper surface of the support without the liability of such fabric to fray or ravel. The spinning down of the flange 11, from the margin of the disk 1, in effect produces an annular recess 12, upon the margin of the disk 1, in such a way that the entire margin of the fabric disk 20, may be inserted into such recess and thereby protect the same.

The entire mechanism is a simple and rigid construction and not liable to distortion in practice. The lightness of the material used and the consequent reduction in weight of the entire structure more than compensates for the extra cost of labor when manufactured in large numbers.

The provision of the loose sleeve 41, upon the spindle overcomes the uneven and irregular rotation of the tablet support which is due to the minute inaccuracies in the train of driving gears in the motor; the loose fit of said sleeve and the enlarged hole therein for the head of the set screw 42, permits a correspondingly slight relative movement of said sleeve upon the spindle.

I claim:

1. In a tablet support for talking machines, the combination of a flat, circular disk having a downwardly and outwardly extended margin, with a dished or cone shaped disk having its outer margin extending upwardly over the margin of said flat disk to form an annular recess in the margin of the tablet support.

2. In a tablet support for talking machines the combination of a flat circular disk, having a downwardly and outwardly extended margin and a dished or cone shaped disk secured to the under face of said flat disk, and having its margin spur down over the margin of said flat disk to form therewith an annular marginal recess.

3. In a tablet support for talking machines the combination of a circular disk,

and a dished or cone shaped disk secured to the under face of said flat disk, and having the margin of said cone shaped disk turned over the margin of said flat disk to form therewith an annular marginal recess.

4. In a tablet support for talking machines the combination of a flat circular disk, and a dished or cone shaped disk, and a sheet metal cup shaped thimble having its bottom secured to the center of said flat disk and its open edge secured to the center of said cone shaped disk.

5. In a tablet support for talking machines the combination of a flat circular disk and a flattened cone-shaped disk, means for securing the margins of said disks together to form an annular marginal recess upon the upper face of said flat disk.

6. In a tablet support for talking machines, the combination of a flat circular disk having a downwardly and outwardly extended margin, with a dished or cone shaped disk having its outer margin extending upwardly over the margin of said flat disk to form an annular recess in the margin of the tablet support, and a pile fabric disk upon the upper face of said flat disk with the margin thereof inserted into said annular recess.

7. In a tablet support for talking machines the combination of a flat circular disk, having a downwardly and outwardly extended margin and a dished or cone shaped disk secured to the under face of said flat disk, and having its margin spun down over the margin of said flat disk to form therewith an annular marginal recess, and a pile fabric disk upon the upper face of said flat disk with the margin thereof inserted into said annular recess.

8. In a tablet support for talking machines the combination of a circular disk, and a dished or cone shaped disk secured to the under face of said flat disk, and having the margin of said cone shaped disk turned over the margin of said disk to form therewith an annular marginal recess, and a pile fabric disk upon the upper face of said flat disk with the margin thereof inserted into said annular recess.

9. In a tablet support for talking machines the combination of a flat circular disk and a flattened cone-shaped disk, means for securing the margins of said disks together to form an annular marginal recess upon the upper face of said flat disk, and a pile fabric disk upon the upper face of said flat disk with the margin thereof inserted into said annular recess.

10. In a tablet support for talking machines, the combination of a flat circular disk having an offset down turned circumferential flange thereon, and a dished or cone shaped disk having a marginal up-

turned flange with the margin of said upturned flange spun over and inwardly to form an annular recess at the outer circumference of said flat disk.

11. In a tablet support for talking machines, the combination of a flat circular disk having an offset down turned circumferential flange thereon, and a dished or cone shaped disk having a marginal upturned flange in engagement with said downturned flange with the margin of said upturned flange spun over and inwardly to form an annular recess at the outer circumference of said flat disk, and a pile fabric disk upon the upper face of said flat disk with the margin.

12. In a tablet support for talking machines the combination of a circular disk having a central aperture therein, with an inverted cup-shaped thimble having a central aperture in the bottom thereof, means for securing said disk and thimble together with their apertures in registry, and a center bearing provided with a conoidal shoulder and supporting flange fitted to said thimble for supporting said tablet support.

13. In a tablet support for talking machines the combination of a flat tablet supporting disk having an enlarged cup shaped thimble secured to the under surface thereof with a center bearing loosely fitted to said thimble and provided with an annular supporting flange upon which the edge or margin of said thimble may rest.

14. In a tablet support for talking machines the combination of a flat tablet supporting disk having an enlarged cup shaped thimble secured to the under surface thereof with a center bearing loosely fitted to said thimble and provided with an annular supporting flange upon which the edge or margin of said thimble may rest, and a slot and pin connection between said thimble and said flange to insure their rotation in unison.

15. In a tablet support for talking machines the combination of a flat tablet supporting disk, a cup shaped thimble centrally secured to the under face of said disk, a marginal flange upon the lower edge of said thimble, a center bearing provided with a removable central sleeve bushing, and a shouldered marginal flange upon which the flange of said thimble may rest and be held against lateral displacement, and a driving mandrel fitted into said sleeve bushing.

16. In a tablet support for talking machines, the combination of a flat, circular disk, provided with an annular off-set marginal flange, a flattened-cone shaped disk, having a marginal upturned flange, spun over the off-set flange of said flat disk, to form therewith an annular recess, and a pile fabric disk upon said flat disk and having its margin inserted into said annular recess, an inverted cup-shaped thimble cen-

trally secured to said disks respectively to rigidly unite them and a central bearing and driving mandrel upon which said thimble is adapted to be supported to rotate therewith.

17. In a tablet support for talking machines the combination of a disk, with an inverted cup-shaped thimble secured to the

center thereof, a center bearing upon which said thimble is detachably supported, a driving mandrel having a loose sleeve bearing thereon for engagement with said center bearing, whereby said-disk and center bearing may have a slight rotation movement relative to said mandrel. 10

PLINY CATUCCI.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."

AUTOMATIC STOPPING DEVICE FOR TALKING MACHINES.

1,243,174 ----- J. Hines.

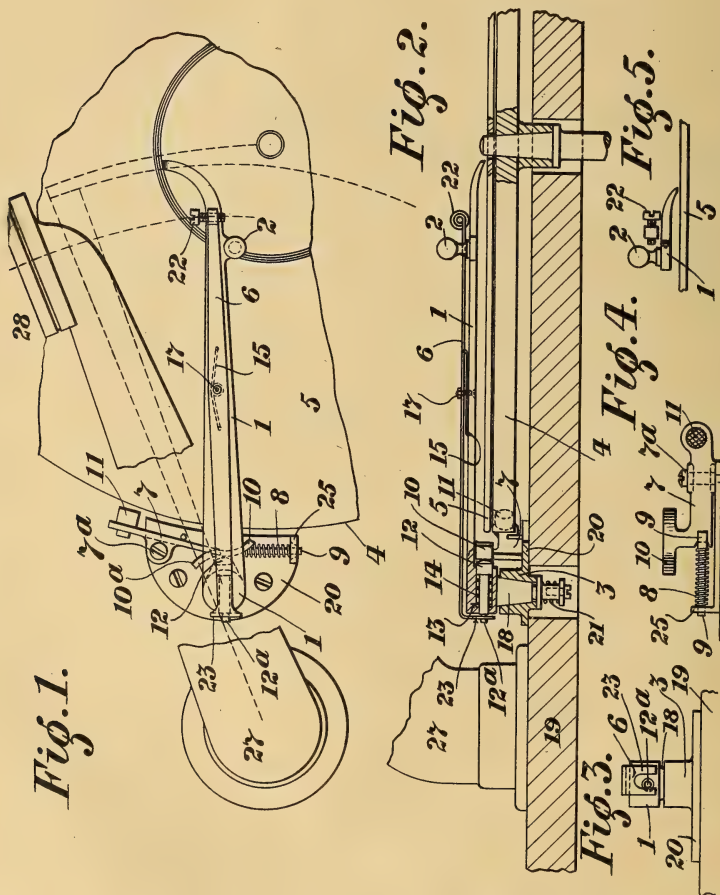
Patented Oct. 16, 1917.

Filed Aug. 1, 1916.

J. HINES.
 AUTOMATIC STOPPING DEVICE FOR TALKING MACHINES.
 APPLICATION FILED AUG. 1, 1916.

1,243,174.

Patented Oct. 16, 1917.



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UNITED STATES PATENT OFFICE.

JAMES HINES, OF GLASGOW, SCOTLAND.

AUTOMATIC STOPPING DEVICE FOR TALKING-MACHINES.

1,243,174.

Specification of Letters Patent.

Patented Oct. 16, 1917.

Application filed August 1, 1916. Serial No. 112,556.

To all whom it may concern:

Be it known that I, JAMES HINES, a subject of the King of Great Britain, residing at Kelvinside, Glasgow, Scotland, have invented certain new and useful Improved Automatic Stopping Devices for Talking-Machines, of which the following is a specification.

The subject of this invention is an improved automatic stopping device for talking machines adapted to be set manually into position to permit rotation of the turntable when a record is to be reproduced and to be actuated automatically to arrest the rotation of the turntable when the reproduction is completed, say, when the stylus has entered the innermost convolution of the spiral groove in the record disk.

The improved device comprises a brake which normally tends to move to the applied position in contact with the turntable but, which, so long as the record is being played, is held out of action by a restraining device held by a latch member mounted on an arm which can be moved, by hand over the record from a non-active position tangential to the machine turntable into the active position which is substantially radial of the turntable. When the arm is in the active position it is adjusted so that its end will be over the last convolution of the record groove or such other part of the groove as it is desired the playing should stop. As the stylus moves along the record groove, the tone arm moves with it until the point is reached where it is desired the playing should cease when the sound box or other part on or connected with the tone arm contacts with the latch member and causes it to free the restraining device which thereupon moves out of action and allows the brake to immediately act and stop the turntable.

After the brake has acted, by again turning the arm toward the tangential position, the restraining device can be again put into action so as, on again turning the arm to the radial position, to overcome the brake and hold it out of action, thereby enabling the machine to re-start.

The brake has, preferably, a toggle joint with spring actuation and the latch member has, as well as the restraining device, a spring action.

The invention is illustrated by way of example in the accompanying drawings in which Figure 1 is a plan, Fig. 2 a part ele-

vation part vertical section showing the improved starting and stopping device in operative relation to the turntable; Figs. 3, 4 and 5 show details.

Referring to the drawings:—

The movable arm 1 has a tapered pivot pin 18 working, with friction tightness, in a socket 3 forming part of a plate 20 which is secured to the top of the box or case 19 of the machine at a place beyond but yet adjacent to the periphery of the turntable 4. The pivot pin is retained tightly in its socket by a spring 21. The arm, when inoperative, is disposed to one side of the turntable but when it is desired to bring it into the operative position it is turned, by hand, by means of the finger knob 2, to a position (see Fig. 1) which is approximately radial of the turntable and so that it overhangs the record disk 5, see Fig. 2. On the top of the arm is a latch member 6 which has an adjustable stop 22 at its one end and a jaw 23 at its other end and is pivoted on a pin 17 and is capable of being retracted, after movement, by a spring 15. 7 is one member of the brake and is pivoted at 7^a its one arm carrying a rubber or other suitable brake shoe 11 and its other arm, a cam piece 10 of undulatory form as shown at Figs. 1 and 4. The member 7 is engaged by a fork at the one end of a pin 9 whose other end passes freely through a hole in a bracket 25, this pin 9 being not only retained in engagement with the member 7 by a spring 8 but also acted on by the spring in such manner as to normally urge the brake shoe 11 into operative position. In the socket 13 of the arm 1 is a restraining pin 12 having a spring 14 weaker than spring 8 which normally tends to force it outward as at Fig. 2 in which position it is retained by the jaw 23 of the latch member 6 engaging its reduced outer end 12^a. The spring 8 is strong enough to overcome the spring 14 whenever the pin 12 is released from the jaw 23 but so long as the pin is retained by the jaw and the arm 1 is in the radial position the pin 12 acts on the toggle joint formed by member 7 and pin 9 and retains the brake out of action as at Fig. 1. When the arm 1 is in the inoperative position it is preferably arranged to lie substantially tangential to the periphery of the table 4 with the pin 12 forced outward and held by the jaw 23, and, when the arm is to be put into the operative position, it is turned through an arc of 90° or more, as de-

sired, and during this turning movement the pin 12 contacts with the cam piece 10 and forces it outward, against the action of spring 8, so as to move the brake out of the operative position. When the pointed end of the arm has been carefully adjusted so as to be over, say, the last convolution of the spiral groove of the record, the device is set. Immediately the record is finished the sound box 28 on the tone arm 27 strikes against the stop 22, moves the latch member 6 to disengage the pin 12 which is immediately retracted whereupon the spring 8 forces the brake shoe 11 into contact with the turntable 4 and stops the machine. The frictional grip of the pivot pin 18 is sufficiently great to retain the arm 1 in position while the latch 6 is being pushed aside (against the action of the spring 15) by the sound box.

The record having been played it can be removed and a new record inserted and, thereafter, the arm 1 be turned to or toward its tangential position to free the pin 12 from the cam 10 and allow it to again project under the action of spring 14 whereupon the arm is again returned to the radial position for adjustment to the new record, the action of the trigger during this return movement taking off the brake shoe and permitting the machine to re-start.

It will be seen that as the free end of the latch member occupies, at the moment the latch member is tripped, a position adjacent to the center of the turntable and is acted on by the sound box or a tripping member thereon at a point remote from the pivot of the tone arm, the latch member constitutes a very sensitive interponent of a stop motion mechanism.

While I have described a preferred construction capable of being conveniently fitted to existing talking machines, it will be evident that the invention is not limited to the particular form described and that the details of construction may be widely varied without departure from the scope of the invention as defined by the appended claims.

Having now fully described my invention, what I claim and desire to secure by Letters Patent is:—

1. An automatic stopping device for talking machines comprising, in combination, an automatic spring actuated brake, means for restraining the action of the brake, a swinging arm pivotally and frictionally mounted by a pin and socket joint, means for retaining the pivot in the socket, a latch member on the arm adapted to remove the restraint from the brake on being struck by the sound box of the tone arm of the machine and a retracting spring for the latch member.

2. An automatic stopping device for talking machines comprising, in combination, an

automatic brake consisting of a pivoted member, a toggle pin embracing the end of said member and a spring tending to apply the brake, means for restraining the action of the brake, a movable arm, means on the arm adapted to remove the restraint from the brake and allow it to act, and means for actuating said last mentioned means.

3. An automatic stopping device for talking machines comprising, in combination, an automatic brake consisting of a pivoted member with cam piece, a toggle pin embracing the end of said member and a spring tending to apply the brake, means adapted to act on the cam piece for restraining the action of the brake, a movable arm, means on the arm adapted to remove the restraint from the brake and allow it to act, and means for actuating said last mentioned means.

4. An automatic stopping device for talking machines of the disk-record type comprising, in combination, an automatic brake, a pivotal arm capable of being moved over the record, by hand, to the stopping position, a spring pin therein capable of holding the brake out of action, retaining means on the arm for said pin and means for actuating said retaining means so as to free the pin and permit the brake to act.

5. An automatic stopping device for talking machines comprising, in combination, an automatic brake, a movable arm, which is adjustable by hand and has a frictional joint, a spring pin therein capable of holding the brake out of action, a latch member on the arm for retaining said spring pin, and means for actuating said retaining means so as to free the pin and permit the brake to act.

6. An automatic stopping device for talking machines comprising, in combination, an automatic brake, a hand operated arm pivoted on the machine case, and frictionally held in adjusted position, a spring pin in said arm and capable of holding the brake out of action, means on the arm for retaining said pin in position said means being capable of movement by a part on the tone arm of the machine to free the said pin.

7. An automatic stopping device for talking machines comprising, in combination, an automatic brake, an arm pivoted on the machine case, a spring pin in said arm and capable of holding the brake out of action, means on the arm for retaining said pin in position said means being capable of actuation by a part on the tone arm of the machine in one direction and by a spring in the other direction.

8. An automatic stopping device for talking machines comprising, in combination, an automatic brake consisting of a pivoted member, a toggle pin embracing the end of said member and a spring tending to apply the brake,

a movable arm, a spring pin therein capable of holding the brake out of action, retaining means on the arm for said pin and means for actuating said retaining means so as to free the pin and permit the brake to act.

9. An automatic stopping device for talking machines comprising, in combination, an automatic brake, a movable arm, a spring pin therein capable of holding the brake out of action, a pivoted and spring retracted latch member on the arm for retaining said spring pin and means for actuating said retaining means so as to free the pin and permit the brake to act.

10. An automatic stopping device for talking machines comprising, in combination, an automatic brake, a movable arm, a spring pin therein capable of holding the brake out of action, a pivoted and spring retracted latch member on the arm having a jaw at its end for engaging and retaining said spring pin and means for actuating said retaining means so as to free the pin and permit the brake to act.

11. An automatic stopping device for talking machines of the disk-record type, comprising, in combination, an automatic spring actuated brake, means for restraining the action of the brake, an arm which

can be moved by hand over the record to a stopping position, a socket on the machine case, a pivot on said arm which frictionally engages in said socket, means for retaining the pivot in the socket, means on the arm adapted to remove the restraint from the brake and allow it to act and means for actuating said last mentioned means.

12. An automatic stopping device for talking machines of the disk-record type, comprising, in combination, an automatic spring actuated brake, means for restraining the action of the brake, an arm which is movable by hand, over the record and has a pivot pin at its one end, a socket on the machine case in which said pivot pin works, a spring tending to hold the pivot pin in the socket, a latch member on the arm adapted to remove the restraint from the brake and allow it to act, a spring acting on said latch member to retract the same after movement and means for actuating the said latch member.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES HINES.

Witnesses:

H. D. FITZPATRICK,

WILLIAM GALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MOTOR MECHANISM AND SPEED REGULATING MEANS THEREFOR.

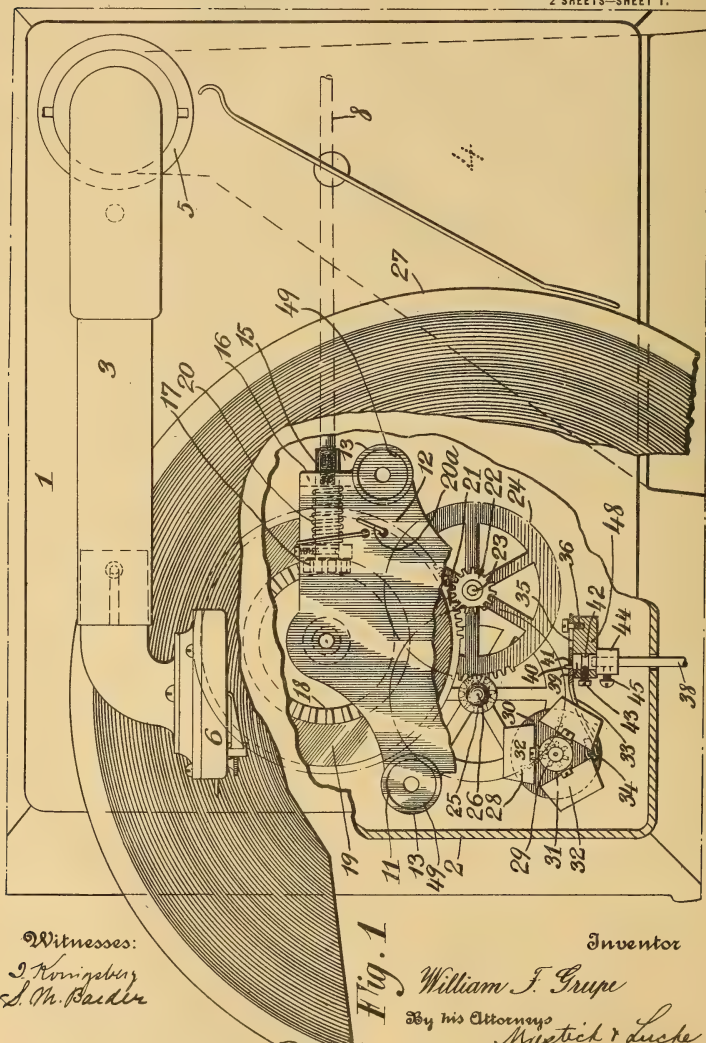
1,243,285 ----- W. F. Grupe;
Patented October 16, 1917.
Filed Feb. 20, 1915.

W. F. GRUPE,
MOTOR MECHANISM AND SPEED REGULATING MEANS THEREFOR.
APPLICATION FILED FEB. 20, 1915.

1,243,285.

Patented Oct. 16, 1917.

2 SHEETS—SHEET 1.



Witnesses:
J. Königsberg
L. M. Becker

Fig. 1

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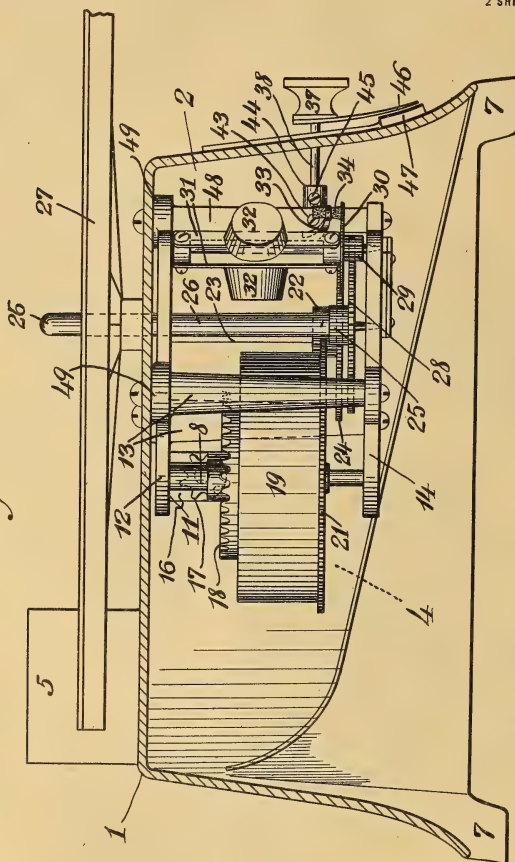
W. F. GRUPE.
MOTOR MECHANISM AND SPEED REGULATING MEANS THEREFOR.
APPLICATION FILED FEB. 20, 1915.

1,243,285.

Patented Oct. 16, 1917.

2 SHEETS—SHEET 2.

Fig. 2



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By his Attorneys
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UNITED STATES PATENT OFFICE.

WILLIAM F. GRUPE, OF JERSEY CITY, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO VAN-O-PHONE COMPANY, OF NEW YORK. N. Y., A CORPORATION OF NEW YORK.

MOTOR MECHANISM AND SPEED-REGULATING MEANS THEREFOR.

1,243,285.

Specification of Letters Patent.

Patented Oct. 16, 1917.

Application filed February 20, 1915. Serial No. 9,613.

To all whom it may concern:

Be it known that I, WILLIAM F. GRUPE, a citizen of the United States, residing at Jersey City, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Motor Mechanisms and Speed-Regulating Means Therefor, described more particularly herein and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a phonograph comprising a motor mechanism and speed regulating means therefor illustrating one form of my invention, parts of the casing and frame of the motor mechanism being broken away for the sake of clearness; and

Fig. 2 is a side sectional elevation of the same.

Referring to the drawings, the casing 1 of the phonograph comprises the sub-casing 2 and the "horn" 4, the latter forming the terminal portion of the sound tube 3. The sound tube 3 is movable relatively to the casing 1 and is secured thereto by means of the collar 5. The second-box 6 is suitably attached to the movable sound tube 3. The casing 1 is provided with feet 7 adapted to rest on a table or the like.

The sub-casing is disposed on one side of the casing 1 and incloses the motor mechanism. The winding crank of the motor mechanism comprises a suitable handle (not shown) disposed exteriorly of the side of the "horn" 4, the shaft 8 of the winding crank passing through an opening in the outer wall of the "horn" 4 and through an opening in the top wall of sub-casing 2. The motor mechanism *per se* is carried by the frame 11 secured to the top wall of sub-casing 2 as by screws.

The frame 11 comprises the upper plate 12, the side bars 13 and the lower plate 14. The side bars 13 are preferably cast integrally with either plate 12 or plate 14; as shown, the side bars 13 are cast integrally with the upper plate 12 and are of an elongated cone-shape to facilitate withdrawal of the casting from the mold. Such construction effects an improved rigidity of the frame parts and secures the reduction of the number of the frame parts and the amount of material of same to the minimum; in

addition, the labor of assembling the frame and the parts of the motor mechanism thereon is materially decreased.

As shown in Fig. 1, the winding shaft 8 enters through collar 15, fixed to the depending lug 16, preferably cast integrally with the upper plate 12. The spur gear 17, having teeth of preferably rounded ends, is fixed to the end of winding shaft 8 and meshes with a similarly cut gear 18, in fixed relation to the barrel 19 of the motor spring. Adjacent the inner end of the winding shaft 8 is provided the coiled spring 20 having one end 20^a fixed to the plate 12 and its body portion wound a sufficient number of times about the shaft 8, the other end being loose; the winding of spring 8 is in such direction that the spring 20 is loosened when the shaft 8 is turned in the direction of winding the motor spring, but upon movement of the shaft 8 in the opposite direction the coiled spring 20 by frictional engagement with shaft 8 is automatically tightened and precludes further turning of shaft 8 in such direction. The driving gear 21, fixed to the driving end of the motor spring, meshes with pinion 22, fixed on shaft 23 to which is also fixed the gear 24, meshing in turn with pinion 25 fixed on driving shaft 26, to which the turntable 27 is suitably secured.

The speed regulating means comprises the gear 28 fixed to driving shaft 26 and meshing with pinion 29 carried by the centrifugal governor comprising the disk 30, springs 31 and weights 32. The arm 33 carries the pad 34 at its free end, said pad 34 coöperating with the disk 30 to determine the desired speed. The arm 33 is pivoted at another portion, such as by means of the slot 35 and screw 36. The position of the pad 34 relative to the disk 30 is controlled by suitable regulating means manipulated by the head nut 37 (Fig. 2). In the specific form illustrated the head nut 37 is fixed to the stud 38 to which is secured the circular end nut 39. The pin 40 is positioned eccentrically on the outer face of end nut 39 and projects through the circular opening 41 in the arm 33. The end nut 39 is provided with the peripheral groove 42 into which extends the guide screw 43. The collar 44 fixed by set screw 45 to the stud 38 assists

in precluding displacement of the end nut 39 longitudinally of the stud 38. The index 46 and speed indicating scale 47 (Fig. 2) are provided on the face of the sub-casing 2 to indicate the speed of the rotating table 27.

Viewing the relative positions of these parts as indicated in Fig. 1, the rotation of the head nut 37 in the counter-clockwise direction will cause the eccentric pin 40 to descend and therewith move the pad 34 downwardly until the disk 30 under control of the springs 31 and weights 32 is braked by the pad 34. Similarly, upon turning the head nut 37 in the clockwise direction, the eccentric pin 40 will be moved upwardly and thereby cause the pad 34 to ascend and permit the disk 30 to move upwardly under the centrifugal action of the springs 31 and weights 32. It will be noted that the slot 35 which provides for the relatively longitudinal movement of the arm 33 may be positioned at any desired portion of the arm 33. The fulcrum screw 36 and the guide screw 43 are shown tapped into the post 48 formed preferably integrally with a plate of the motor frame 11. The heads of the side bars 13 are preferably enlarged, as at 49 to provide the desirable spacing between the upper frame plate 12 and the top wall of the sub-casing 2. Preferably the taps for the positioning screws 12 are disposed within the relatively thickened ends of said side bars 13, whereby longer tap holes or thicker positioning screws, or both, are made available for securing a firmer attachment between the frame of the motor mechanism and the upper wall of the casing. If desired, rubber or other resilient cushions may be interposed between the spacing lugs and the top wall of the sub-casing 2.

It will be noted that the parts of the speed regulating means are supported entirely by the frame 11 of the motor mechanism. By such provisional means when the motor mechanism and speed regulating means have been tested and adjusted, preparatory to final assembling, the desired adjustment will be insured after the motor mechanism and speed regulating means have been assembled within the casing of the phonograph.

Whereas I have illustrated my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from my invention.

What I claim and desire to secure by Letters Patent is:—

1. The combination with a casing for a phonograph or the like, of a frame for the motor mechanism comprising an upper plate and side bars cast integrally therewith, the connecting portion of said side bars adjacent said plate being enlarged and having

tap holes therein, and connecting means passing through said casing into said tap holes.

2. The combination with a casing of a phonograph, of a frame for the motor mechanism comprising an upper plate, side bars cast integrally with said upper plate, said side bars being relatively thicker at the portion thereof adjacent said upper plate and having tap holes therein and spacing lugs disposed at the tops of said side bars and extending above said upper plate, and connecting means passing through said casing into said tap holes.

3. A frame for a motor mechanism comprising in combination an upper plate and side bars cast integrally therewith, the portion of said frame adjacent one of said side bars being enlarged, said enlarged portion being provided with a recess, and connecting means positioned in said recess adapted to suspend said frame from a suitable support.

4. A frame for a motor mechanism comprising in combination an upper plate and side bars cast integrally therewith, the portions of said frame adjacent said side bars respectively being enlarged, said enlarged portions being respectively provided with a recess, and connecting means positioned in said recesses respectively adapted to suspend said frame from a suitable support.

5. A frame for a motor mechanism comprising in combination an upper plate and side bars cast integrally therewith, the portions of said frame adjacent said side bars respectively being enlarged, said enlarged portions being respectively provided with a recess, and connecting means positioned in said recesses respectively adapted to suspend said frame from a suitable support.

6. A frame for a motor mechanism comprising in combination an upper plate and side bars cast integrally therewith, the portions of said frame adjacent said side bars respectively being enlarged, said enlarged portions serving as spacing means and respectively provided with a recess, and connecting means positioned in said recesses respectively adapted to suspend said frame from a suitable support.

7. A frame for a motor mechanism comprising in combination an upper plate and tapered side bars cast integrally therewith, the portions of said frame adjacent said side bars respectively being enlarged, said enlarged portions serving as spacing means and respectively provided with a recess, and connecting means positioned in said recesses and adapted to suspend said frame from a suitable support.

8. A frame for a motor mechanism comprising in combination an upper plate and side bars cast integrally therewith, said side bars being tapered inwardly in the direc-

tion away from said upper plate, the portions of said frame adjacent said side bars being respectively enlarged, said enlarged portions being respectively provided with a
 5 recess and connecting means positioned in said recesses and adapted to suspend said frame from a suitable support.

9. A frame for a motor mechanism comprising in combination an upper plate and
 10 side bars cast integrally therewith, the portion of said frame adjacent said side bars being enlarged, said side bars being tapered inwardly in the direction away from said upper plate, said enlarged portions extend-
 15 ing above the upper face of said upper plate to serve as spacing means and respectively provided with a recess, and connecting means positioned in said recesses and adapted to suspend said frame from a suitable
 20 support.

10. The combination with motor mechanism, of a speed governor comprising a disk, a centrifugal device driven by said motor mechanism and controlling said disk, an
 25 arm having a slot extending longitudinally thereof, a positioning device passing through said slot, a friction pad carried by said arm and adapted to engage a face of said disk, an eccentric element passing
 30 through an opening in said arm, and means for rotating said eccentric element.

11. The combination with motor mechanism, of a disk, a centrifugal device driven by said motor mechanism and controlling
 35 said disk, an arm having a slot extending longitudinally thereof, a positioning element

passing through said slot, a friction pad carried by said arm and adapted to engage a face of said disk, an eccentric element passing through an opening in said arm, said
 40 opening being positioned intermediate said friction pad and said slot, and means for rotating said eccentric element.

12. A frame for a motor mechanism, comprising in combination an upper plate and
 45 side bars cast integrally therewith, speed governing means comprising a regulating element carried by one of said side bars, said upper plate having enlarged portions adjacent certain of said side bars, said en-
 50 larged portions being provided with recesses and connecting means positioned in said recesses adapted to suspend said frame from a suitable support.

13. A frame for a motor mechanism comprising in combination an upper plate and
 55 side bars cast integrally therewith, speed governing means comprising a shaft, means for mounting said shaft on two of said side bars, said upper plate having enlarged por-
 60 tions adjacent certain of said side bars, said enlarged portions being provided with recesses and connecting means positioned in said recesses adapted to suspend said frame from a suitable support.
 65

In testimony whereof I have signed this specification in the presence of two sub-
 scribing witnesses.

WILLIAM F. GRUPE.

Witnesses:

K. G. LE ARD,
 S. M. BAEDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MULTIPLE DISK TALKING MACHINE.

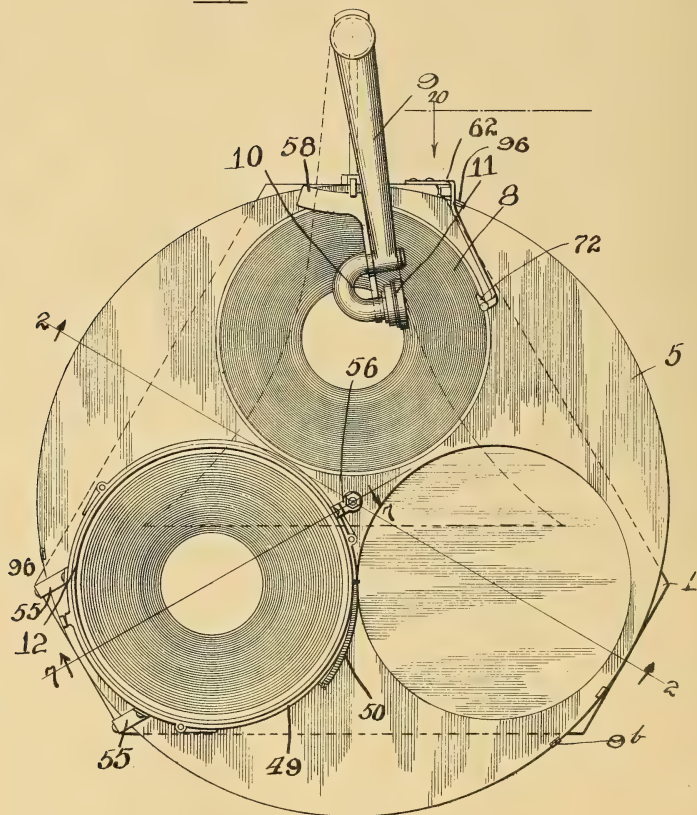
1,243,385 ----- E. M. Glasen.
Patented Oct. 10, 1917.
Filed Dec. 10, 1913.

E. M. CLASEN.
 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.
 7 SHEETS—SHEET 1.

Fig. 1



WITNESSES

J. H. Angell.
 Charles W. Hills, Jr.

INVENTOR

Emil Milton Clasen
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 ATTORNEY

E. M. CLASEN.
 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.

7 SHEETS—SHEET 2.

Fig 3

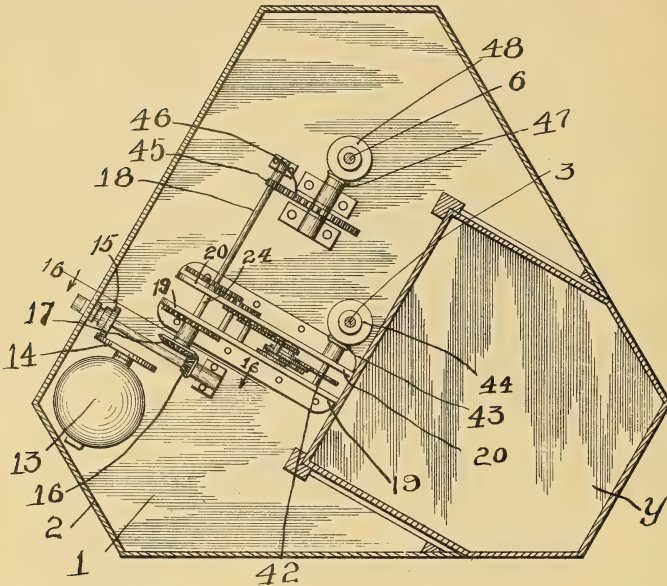
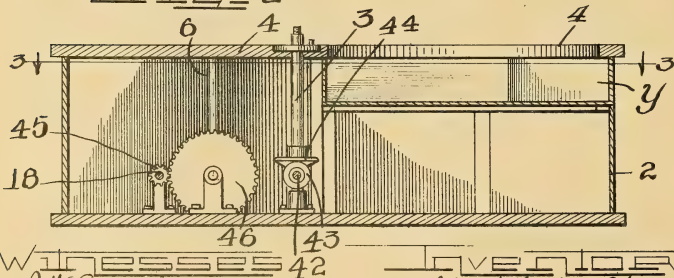


Fig 2



WITNESSES 42

W. Angier
Charles J. Hill

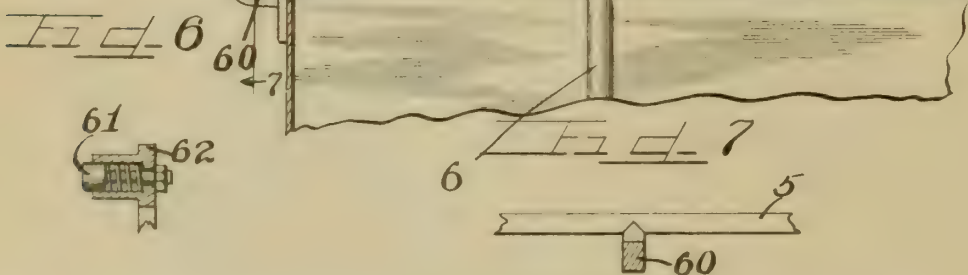
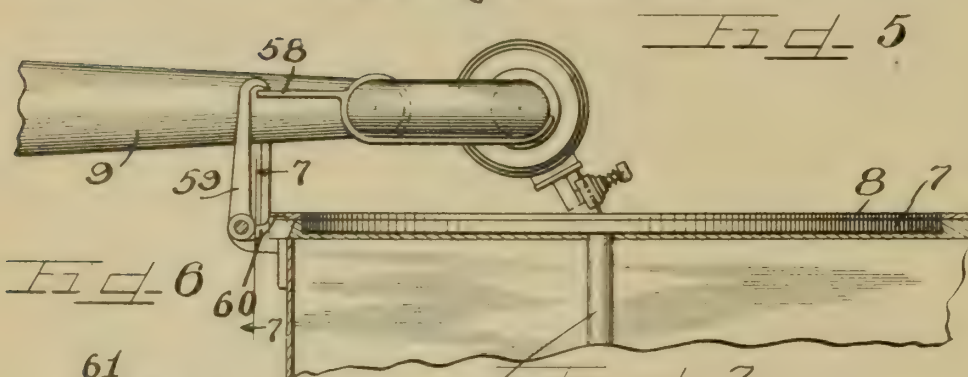
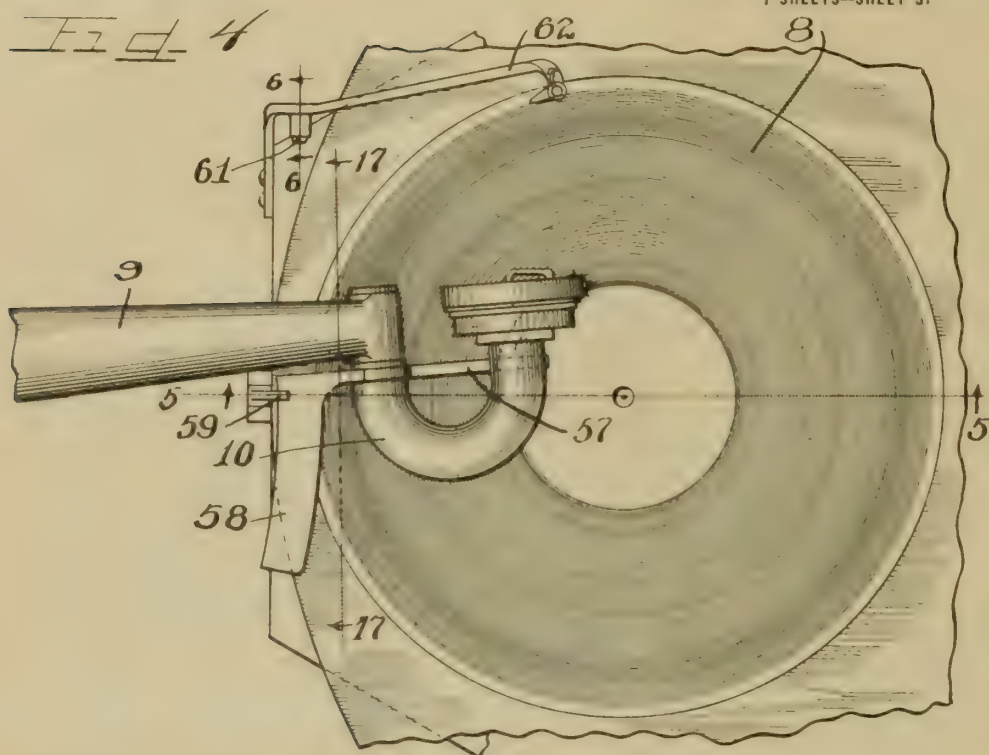
INVENTOR
E. M. Clasen
Charles J. Hill Atty.

E. M. CLASEN.
 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.

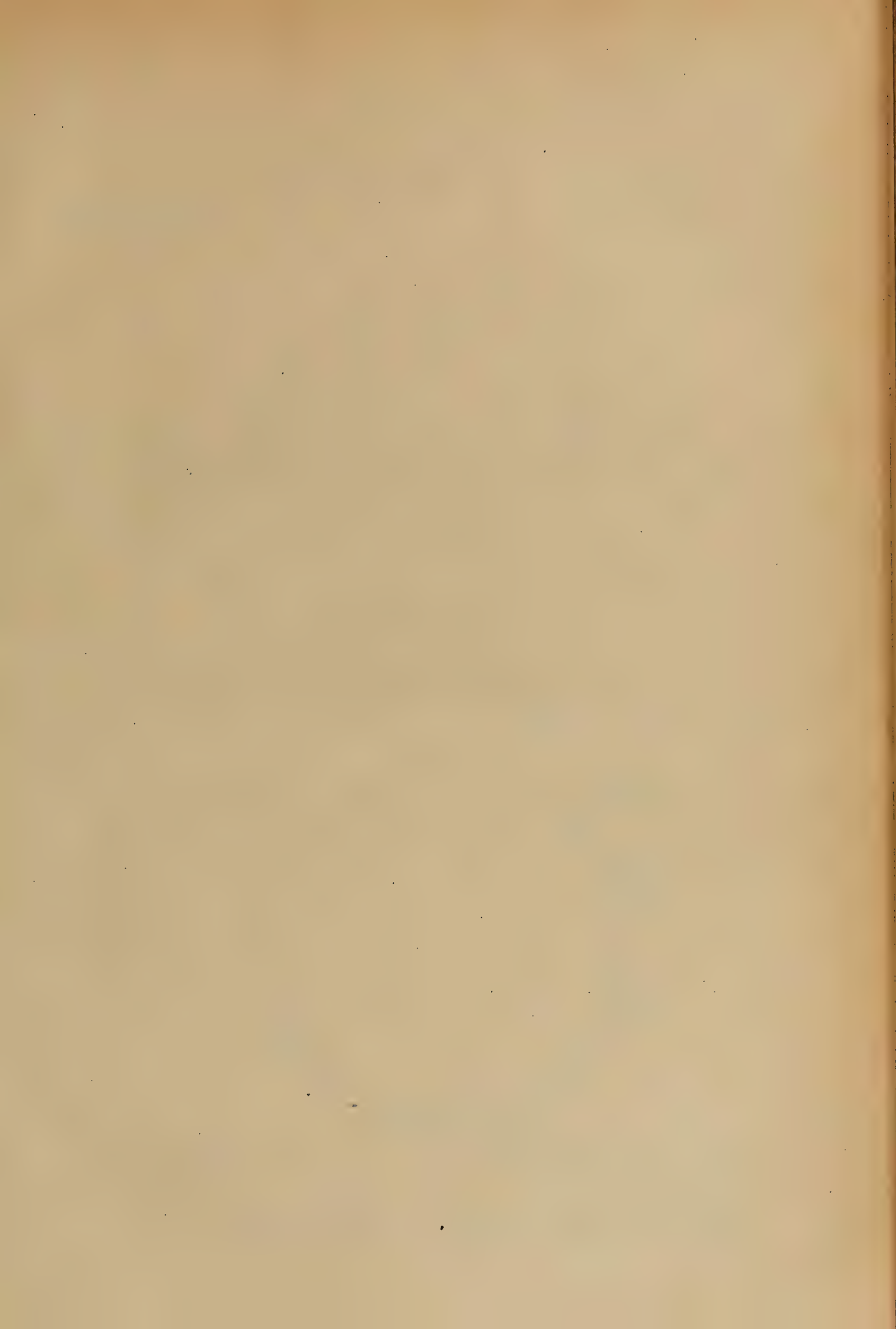
7 SHEETS—SHEET 3.



WITNESSES

J. St. Angell.
 Charles F. Hill.

INVENTOR
 Emil Milton Clasen
 Charles F. Hill, Atty.

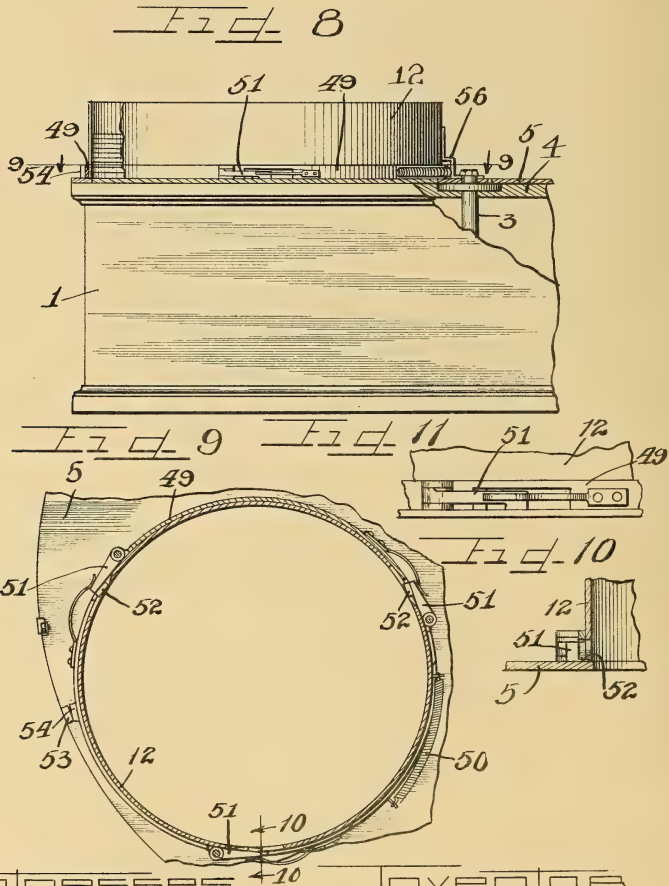


E. M. CLASEN.
 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.

7 SHEETS—SHEET 4.



WITNESSES

J. H. Angell.
 Charles W. Hill, Jr.

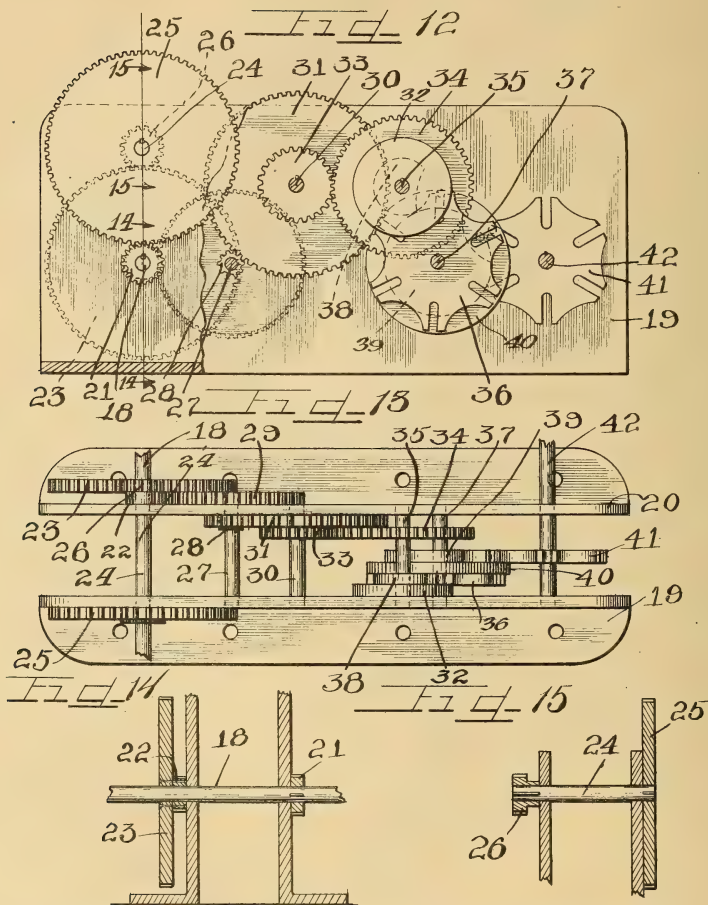
Inventor
 E. M. Clasen
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 Att'y.

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 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.

7 SHEETS—SHEET 5.



WITNESSES

J. M. Angell
 Charles W. Hill

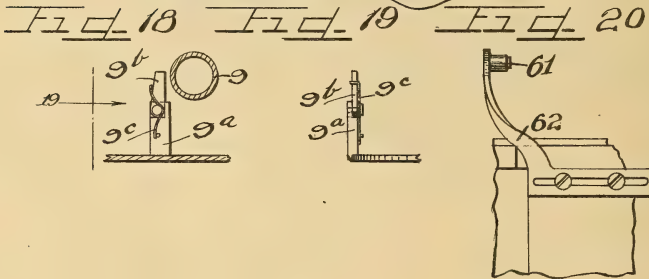
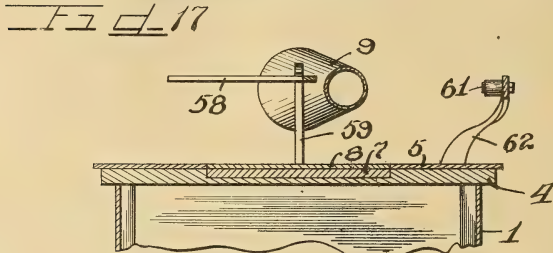
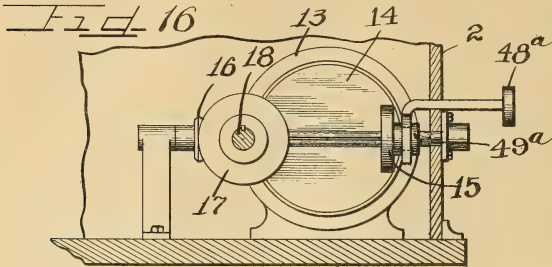
INVENTOR

Emil Milton Clasen.
 Charles W. Hill, ATT.

E. M. CLASEN.
 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.
 7 SHEETS—SHEET 6.



WITNESSES

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INVENTOR

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 MULTIPLE DISK TALKING MACHINE.
 APPLICATION FILED DEC. 10, 1913.

1,243,385.

Patented Oct. 16, 1917.

7 SHEETS—SHEET 7.

Fig. 21

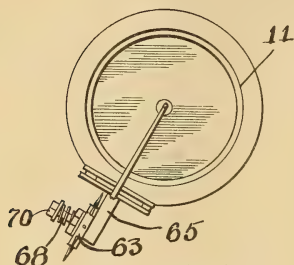


Fig. 23

Fig. 22

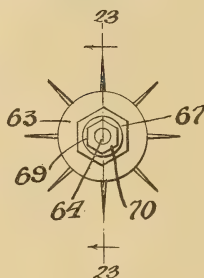


Fig. 24

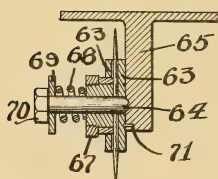
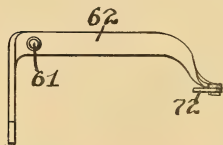


Fig. 25

Fig. 26



WITNESSES

W. C. Angell
Charles W. Filler

INVENTOR

Emil Milton Clasen
Charles W. Filler

UNITED STATES PATENT OFFICE.

EMIL MILTON CLASEN, OF CHICAGO, ILLINOIS.

MULTIPLE-DISK TALKING-MACHINE.

1,243,385.

Specification of Letters Patent.

Patented Oct. 16, 1917.

Application filed December 10, 1913. Serial No. 805,672.

To all whom it may concern:

Be it known that I, EMIL MILTON CLASEN, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Multiple-Disk Talking-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

Heretofore, although machines employing cylindric records have been arranged to permit a plurality of record cylinders to be continuously and automatically operated in the same machine, it has been difficult (and deemed impractical) to continuously operate a plurality of flat or disk records in a single machine. In consequence, a considerable interval of time must elapse in such instances after the reproduction of the selection before the played record can be removed, a new record substituted, a reproducing needle changed, and the machine again set in operation. This is objectionable in many instances, as, for instance, when a number of records are to be used consecutively as in the reproduction of certain operas and other musical productions in which case a marked interval of time elapses during the changing of records, causing an unpleasant break in the performance, which is distinctly distasteful to the hearer.

The object of this invention is to provide a talking machine adapted to receive a magazine of records, as, for instance, an entire opera, lecture, or other selection requiring more than one record for its production and to so construct and arrange the machine and its mechanisms as to enable the records to be played one by one and consecutively until the last of the series has been reproduced and to successively discharge the played records into a receptacle provided for that purpose, thus maintaining substantially the

same order as that in which the records were arranged in the magazine.

It is also an object of the invention to afford mechanism for automatically and quickly shifting the sound box and arm therefor from the point where the reproduction of the last record was completed to the point for beginning the next succeeding record.

It is also an object of the invention to afford means for supporting a part of the records in the magazine while the record selected for playing is discharged from the magazine into position for reproduction.

It is an important object of the invention to afford means for automatically shifting the needles to automatically present, if desired, a fresh needle for use on each record and also to provide in a machine of the class described in connection with a magazine of records to be successively played, a magazine for needles to enable a fresh needle to be employed on each record.

The invention contains many novel features and consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings:

Figure 1 is a top plan view of a device embodying my invention, showing the horn in dotted lines.

Fig. 2 is a slightly reduced section on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary top plan view of the reproducing mechanism, table, and record.

Fig. 5 is a section on line 5—5 of Fig. 4.

Fig. 6 is an enlarged section on line 6—6 of Fig. 4.

Fig. 7 is a section on line 7—7 of Fig. 5.

Fig. 8 is a fragmentary side elevation of the machine, showing the magazine broken away.

Fig. 9 is a section on line 9—9 of Fig. 8.

Fig. 10 is a section on line 10—10 of Fig. 9.

Fig. 11 is a fragmentary face view of that portion of the device shown in Fig. 10.

Fig. 12 is an enlarged side elevation of the mechanism for operating the tables.

Fig. 13 is a top plan view of the same partly broken away and with parts omitted.

Fig. 14 is an enlarged section on line 14—14 of Fig. 12.

Fig. 15 is a section on line 15—15 of Fig. 12.

Fig. 16 is an enlarged fragmentary detail of the mechanism for varying the rate of rotation of the disk.

Fig. 17 is a section taken on line 17—17 of Fig. 4.

Fig. 18 is a fragmentary sectional detail of a part of the trip mechanism for stopping and returning the sound box and reproducer arm to starting position.

Fig. 19 is a view in elevation of the same taken in the direction of the arrow 19, on Fig. 18.

Fig. 20 is a fragmentary view in elevation taken in the direction of the arrow 20, on Fig. 1.

Fig. 21 is a face view of the reproducer and sound box showing the magazine needle holder in place.

Fig. 22 is an enlarged face view of the magazine needle holder showing the same detached from the sound box.

Fig. 23 is a section on line 23—23 of Fig. 22.

Fig. 24 is a face view of a part of the needle holder.

Fig. 25 is an enlarged side elevation of the shifting device for the needles.

Fig. 26 is an enlarged detail of the resilient finger whereby the needle magazine is shifted to present a new needle.

As shown in the drawings:

The machine comprises the usual or any suitable base consisting preferably of a casing comprising a bottom 1, and side walls 2, which may be of any desired number and form, and provided in one side with a drawer Y, of sufficient size and depth to hold the entire magazine of records to be played continuously.

Extending centrally upward in said base, and driven intermittently as hereinafter described, is a spindle 3, which extends through the top 4, of the base or case, and on which is rigidly secured a circular table 5, which rests flat on said top 4, of the case. Said circular table is of a size to afford circular apertures therethrough, each of a size to receive therein a disk record of the size to be played.

As shown, said top 4, is also provided with an aperture therethrough of a size to permit a record disk to fall into the drawer or compartment Y, as shown in Fig. 2.

Extending upwardly in said base or cas-

ing at a point midway between said central shaft 3, and the circumference of the table, is a continuously rotatable shaft 6, secured on the top of which and set into the table flush with the top thereof, is a rotating table 7, on which the disk 8, is supported while playing. Mounted upon said base or any convenient support is the tubular reproducer arm 9, having adjustably secured thereon at its inner end the goose neck 10, on which is secured the sound box 11, and on which is rotatably secured the needle magazine hereinafter more fully described. Said arm and sound box may be of the usual or any desired construction and are free to be fed from the periphery toward the center of the disk as is usual by the engagement of the needle in the record groove of the disk. Rigidly secured on said base and supported over the table and in close relation with the rotatable table 5, is a magazine holder 12, which is so positioned on said base that the same will register with one of the apertures in the rotating table when another of said apertures registers with the rotating disk table and the other of said apertures registers with the aperture into the drawer.

Means are provided for simultaneously rotating said table to discharge the played record and to position a record to be played upon the rotating disk table, and also to support the remaining records in the magazine while the one to be played is withdrawn therefrom. For this purpose, as shown, a motor 13, is provided in said casing provided, as shown, with a friction disk 14, which drives a friction wheel 15, which actuates a bevel pinion 16, meshing with a bevel gear 17, secured on the main shaft 18, of the device. Said shaft is journaled in upright parallel frame plates 19 and 20, and extending therethrough above said shaft is a shaft 24. Said shaft 18, is provided on its side adjacent the motor with a pinion 21, and the opposite side of said frame from said motor with a pinion 22, and a gear 23, which are rotative on said shaft but are rigidly secured together.

Secured on the end of said shaft 24, adjacent the motor and meshing with the pinion 21, is a gear wheel 25, and secured on the opposite end of said shaft, and meshing with the gear wheel 23, is a pinion 26. Extending through the frame in advance of said shafts is a shaft 27, having on its end opposite the motor a pinion 28 on the inside of frame plate 20, and a gear 29 on the outside of frame plate 20, to mesh with the pinion 22, on the shaft 18. Journaled in the frame is a shaft 30, on which is mounted a gear 31, which meshes with the pinion 28, on the frame shaft 27, and is also provided with a gear of smaller diameter 33, which meshes with a gear 34, on a shaft 35,

and on which also, as shown, is secured a cam 38 and disk 32, whereby the Geneva gear 36, on the shaft 37, is rotated intermittently, due to engagement of a pin on said disk with said Geneva gear.

As shown, said cam 38, at all times bears against the periphery of said Geneva gear 36, and acts to hold the same except during its brief interval of travel, and as shown, said Geneva gear is provided with six radial slots adapted to afford six intermittent movements thereof during each rotation and as shown, also, secured on the shaft 37, is a cam 39, and pin disk 40, said disk acting on a six point Geneva gear 41, secured on the shaft 42. Said shaft 42, is provided at its extremity with a bevel pinion 43, which meshes with a corresponding bevel pinion 44, on the intermittently rotating shaft 3.

The object of the train of Geneva gears before described is to reduce speed of rotation of the table 7 to a point sufficiently below the drive of the motor, and inasmuch as said motor drives at approximately two thousand revolutions per minute, it is necessary to employ some reducing mechanism of which a train of gears is probably the most convenient for reducing the rotation of the rotating table sufficiently to permit one movement thereof in about each five minutes that being approximately the time required to reproduce a record such as those for which the machine is more particularly adapted.

On the extremity of the main shaft 18, is a pinion 45, which drives a gear 46, on the shaft of which is a bevel pinion 47, driving a bevel gear 48, which is secured on the record table spindle 6, the relative size of the gears and pinion on said shaft 18, and the gears co-acting therewith to drive said record disks, is such that at the usual or standard speed of the motor, said record table may rotate at approximately 80 revolutions per minute and that continuously to permit instantaneous reproduction when a record is inserted on the disk table.

Means are also provided for varying the drive of said shaft 6. For this purpose, as shown, a push pin 48^a extends through the wall of the casing, and if desired, along a graduated bar or rod outside of the casing, and at its inner end is engaged by any suitable means on the grooved hub 49^a, of the friction wheel 15, which bears upon the friction wheel 14, of the motor, and which admits of adjusting the speed by shifting said friction disk 15, longitudinally of the shaft. Said revolving table 5, is normally held rigidly from rotation, due to the engagement of the aforementioned Geneva gears. As already mentioned, the intermittently driven rotatable table 5, is provided with a plurality of circular apertures, three in num-

ber and spaced equidistantly. The purpose of these apertures is to afford a retaining means for a record disk whereby the same may be transferred from the magazine to the revolving table on which it is played, and thence around to the compartment or drawer for the reception of the records already played.

Referring to Figs. 1, 8 and 9, it will be seen that a ring or band 49, extends around the outermost lower portion of the magazine 12, and is normally retarded from rotational movement thereabout by a spiral pulling spring 50, one end of which is attached to said ring and the other to said magazine cylinder 12. Pivotally mounted on the exterior of said ring or band 49, are spring actuated pawl members 51, adapted to swing horizontally and each provided at their extremities with a thin, inwardly directed tapered projection 52, adapted to engage between the two lowermost of a pile of disks contained within the magazine, when the table 5, is in a position such that one of the apertures therein is in register with said magazine.

In order to permit the projection of said tapered pawl members into the magazine, said ring 49, and said magazine 12, are provided with apertures adapted, when the ring is in a certain position, to register with one another and, due to the impelling force exerted by the springs for each of the respective pawls, said pawls are projected through the registering apertures and engage between the two lowermost of a pile of disks so that as the rotatable table 5, moves onwardly at the proper time, the lowermost disk which lies in the aperture in the rotatable table will be moved outwardly and the remaining disks will be supported on said inwardly projected pawl members, this facilitating removal of the lowermost disk. As the following aperture in the rotatable table 5, approaches its position of register beneath the magazine 12, a lug 53, properly positioned on said table 5, engages a lug 54, on said ring 49, thus rotating the ring 49, against the tension of its spring 50, such movement of the ring causing retraction of the pawl members 51, inasmuch as the apertures in said ring 49, and said magazine 12, will be moved out of register, and as the aperture in said rotatable table 5, passes in to register beneath the magazine 12, the pile of disks will settle with the lowermost of said disks resting in said aperture.

The movement of the table 5, is so timed, and the lugs 53, so positioned that after the pile of disks has moved downwardly with the lowermost thereof in the aperture in said table, and after the table 5 has begun another shifting movement, the lug 54, will be released by the lug 53, thus permitting the ring 49, to be reversely rotated by its

spring 50, into an initial position with the apertures in said ring and magazine in register, thus permitting projection of the pawl members with the thin tapered portions between the two lowermost disks in the pile to permit repetition of the operation already described.

In order to permit rotation of the table 5, beneath the magazine 12, said magazine is supported above said table at three points by means of the outer brackets 55, which are suitably attached to the casing beneath the table 5, and project therearound over the periphery thereof, and the inner bracket 56 which is journaled on the upper end of said shaft 3.

The rotatable disk or record playing table 7, is recessed into the upper surface of the casing top 4, and is secured to the vertical shaft 6, to be rotated thereby. In order that a record be played, it is necessary that the records be transferred from the magazine, as already described, and then carried by said table 5, to the rotatable playing table 7. The latter table being mounted below the rotatable table 5, and the table 5, coming to rest with an aperture therein directly in register with said playing table 7, the disk to be played is properly centered on said table 7, due to the registering of said table 7, and the aperture in the table 5.

Inasmuch as the initial point on the record is near the outer periphery thereof, it becomes necessary to move the reproducer arm and needle carrying means to the outer periphery of the record to be played, and such movement is effected simultaneously with the positioning of the record upon the record table.

For the purpose of swinging the reproducer arm 9, into initial position a plurality of uprights 9^a, three in number, are mounted on the rotatable disk 5, one adjacent each of the apertures therein. An arm 9^b, is pivoted on the upper end of each of said uprights to contact the arm 9, and a weak spring 9^c, serves to hold said lever normally in contacting position. Accordingly when the disk 5, rotates, the reproducer arm is contacted by one of said arms 9^a, and thus moved into initial position. When the arm has been stopped by means hereinafter described the arm 9^a, is swung downwardly against the impulse of the weak spring 9^c, allowing the upright and lever to pass beneath the arm 9.

Also coincident with the movement of the reproducer mechanism from the inner to the outer portion of the record, the needle must be raised from the disk, and then lowered again, as well as a new needle brought into position to play the record. The mechanism for effecting such a series of operations comprises a lever 57, which is pivoted at the joint between the reproducer arm

and the goose neck, and engages beneath the needle carrying end of the latter to raise and lower the same at the proper time. In order that the needle may be raised from the record prior to and during the movement of the needle to the outer portion of the record, said lever 57, is provided with an arc-shaped extended wing portion 58. A bell crank is pivotally mounted on the edge of the casing with one arm 59, thereof projecting upwardly and adapted to engage over the margin of said extended wing portion 58, and with the other arm 60, thereof engaging upwardly beneath the under surface of said table 5, so spaced and positioned relatively to the apertures in said table 5, that said arm 60, will engage upwardly in a groove when it is desired that the needle be lowered into playing position, but said grooves are of such a length that at other times when it is desired that the needle be raised, as, for instance, more particularly when the needle carrying arm is being moved transversely across the playing disk into initial position, the arm 60, will bear on the flat ungrooved under surface of the table 5, thus depressing said arm 60, and also the upper portion of said arm 59. Such downward movement of the arm 59, against the extended arc-shaped wing portion 58, will cause the lever 57, to be rotated about its pivot point a small amount sufficient to elevate the needle carrying mechanism out of contact with the record.

The purpose of making the wing portion 58, arc-shaped and of a relatively long length is to insure engagement thereof with said lever 59, during the pivotal movement of the reproducing means across the record. When the reproducing arm and needle carrying mechanism have reached the limit of movement or initial position, the arm 9, is stopped in its movement by a spring pressed element 61, attached to the bracket 62. Of course the grooves in the under surface of said table are of such a length that as the reproducing mechanism reaches its limit of movement the arm 60, will move upwardly into a groove, thus permitting elevation of the arm 59, and a lowering of the needle carrying mechanism. It is also desirable that as the arm moves into its initial position that a new needle be substituted for the old one, and this comprises a structure I will now proceed to describe.

Referring to Figs. 21 to 26 inclusive it will be noted that in place of the usual single needle support attached to the diaphragm that the needle support comprises a radially apertured element 63, which is journaled on a stud shaft 64, secured in a stylus bar 65. Mounted on said radially apertured element 63, is a clamping nut 67. As I have shown the device it is capable of

carrying about eight needles, and in order to properly mount the same, the clamping nut 67, is loosened and the needles inserted until they strike the stud shaft 64, after which the nut 67, is tightened and the needles are thereby retained securely therein.

Of course, the element 63, is freely rotatable upon the stud shaft 64, and in order to maintain the same in a predetermined position for playing a record a spiral pushing spring 68, is wound around the outer end of said stud shaft, and bears at one of its ends against the hub of the element 63, and at its other end against a washer 69, retained in position by a nut 70, threaded on the end of said stud shaft. The inner face of said element 63, which abuts against the bar 65, is provided with a plurality of indents, and a pin 71, is secured in said arm 65, and serves to engage said indents in the element 63, due to the longitudinal movement allowed the same by the compression spring 68.

As the reproducing mechanism is swung into initial position the lowermost needle, or that which has been used for playing the last record, strikes a pivoted spring thrust pawl 72, pivoted on an inturned extension of the bracket 62, thus causing rotation of the needle carrying mechanism, and introducing a new needle into position. When the record is played, and as the reproducing mechanism moves inwardly over the record, the pawl 72, of course is easily thrust aside and as the reproducing mechanism passes therepast the pawl returns to a position to repeat the operation already described.

Of course, after the record has been played the driving mechanism being timed, properly, the intermittent drive for said rotatable table 5, rotates the table 5, thus sweeping the record from the playing table 7, and carrying the same around over the aperture in the casing top 4, and dropping the record into the compartment or drawer already mentioned.

The operation is as follows:

Assuming the magazine 12, to be completely filled with records the motor is switched on and the intermittent drive for the rotatable table 5, coming into operation, will cause the table 5, to rotate and carry therewith the lowermost of the pile of disks from the magazine 12, to a position over the rotatable playing table 7, and the drive for said table 5, being correctly timed, the aperture in said table 5, will move into exact register with the playing table 7, thus centering the record to be played thereon. With such movement of the table 5, provided the reproducing arm is not already in its extreme or initial playing position, the reproducing mechanism will be moved to its limit of movement, and on approaching the

limit of such movement, of course the rotatable needle mechanism will be contacted by the pawl 72, thus rotating a new needle into playing position.

Also the arm 60, moving into a properly disposed groove in the under surface of the table 5, will cause lowering of the needle mechanism into playing position, and the playing table 7, rotating as it does, continuously, the record will be immediately played. On completion of the playing the intermittent drive for the table 5, being so timed, the table will rotate, thus causing an elevation of the needle carrying mechanism, and transferring the played disk over the aperture in the table top 4, to cause the disk to drop into the drawer for the purpose, and another of the apertures in said carrying table 5, will transfer the lowermost of the pile of disks in the magazine 12, to the playing table in the same manner already described in connection with the record first played.

The number of needles carried on the needle carrying mechanism if desired may be of a number to play a number of disks equal to that capable of being contained in the magazine 12, or a permanent needle may be connected on the device, and the needle carrying magazine dispensed with, and, also of course the mechanism for causing rotation of the needle carrying mechanism.

I am aware that various details of the invention may be varied through a wide range without departing from the principles. I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. In a device of the class described, a record magazine, carrying means having pockets therein adapted to carry a record therein, a rotatable playing table adapted to receive said records thereon, reproducing mechanism including needle mechanism, means moving and lowering the reproducing mechanism into position on said record to play the same, mechanism governing said needle mechanism, mechanism causing rotation of said carrying means, and a receiving compartment for the records played.

2. In a device of the class described a magazine for holding records, horizontally rotating apertured carrying mechanism adapted to transfer the lowermost of said records therefrom, a rotating playing table adapted to receive said records thereon, needle mechanism, means moving and lowering said needle mechanism into proper playing position on said record, and a compartment to receive the records after the same are played.

3. In a device of the class described a casing, a rotatable apertured table on the top

- thereof, intermittently driven mechanism adapted to rotate said table, a magazine for records mounted above said table, a playing table for records mounted below said table, 65
 5 a compartment for played records mounted below said apertured table, and means permitting the transfer of records from the magazine to the playing table and from the playing table to the receiving compartment.
- 10 4. In a device of the class described a magazine for records, a carrying table adapted to rotate therebeneath, means adapted to be actuated by said carrying table, to support all but the lowermost of 15
 15 said pile of records during the transfer by said carrying table of said lowermost record from said magazine, a rotating table adapted to receive said record thereon, reproducing means adapted to play said record, means 20
 20 associated with said carrying table to operate the reproducing means into initial position, and a compartment to receive the records transferred from said playing table after the record is played.
- 25 5. In a device of the class described a casing, intermittently driven mechanism therein, a rotatable table mounted on said casing, a magazine mounted above said rotatable table and adapted to receive a plurality of 30
 30 records piled horizontally therein, means associated with said magazine to support all but the lowermost of said pile of records, means associated with said rotatable table to transfer said lowermost record from the 35
 35 magazine, a rotating playing table mounted below said rotating carrying table, to receive the record to be played thereon, reproducing mechanism mounted adjacent thereto, means associated with said carrying table 40
 40 for actuating said reproducing mechanism into initial and playing position, and means permitting transfer of the record after the same is played, and a compartment to receive the same.
- 45 6. In a device of the class described a magazine for records, a playing table therefor, a receiving compartment for played records, and a rotatable apertured mechanism 50
 50 above said playing table for transferring a record from one to the other of said elements in proper sequence.
7. In a device of the class described a horizontally rotatable apertured record carrying table, a horizontally rotatable playing 55
 55 table below said carrying table, a record magazine above said carrying table, a receiving compartment below said carrying table adapted to receive records therefrom, and driving mechanisms for each of said 60
 60 tables.
8. In a device of the class described an apertured carrying table, a record playing table therebeneath, a magazine for records above said carrying table, and a receiving 65
 65 compartment below said carrying table.
9. In a device of the class described a continuously rotating playing table, an intermittently driven apertured transfer table, a magazine for records above said transfer table, a receiving compartment below 70
 70 said transfer table and a common driving mechanism for both of said tables.
10. In a device of the class described a playing table, a magazine for records, a receiving compartment and an apertured carrying 75
 75 table adapted when at rest to register with each of said elements.
11. In a device of the class described the combination of a casing, an apertured top thereon, a receiving compartment therein, 80
 80 a record playing table above said top, apertured carrying means above said top and table, said top adapted to support a record engaged in one of the apertures of said carrying means, said record being deposited 85
 85 in said compartment when the apertures in said top and carrying means are opposite one another, and mechanism within said casing for operating said table and carrying means. 90
 90
12. In a device of the class described a playing table, a magazine for records, record releasing mechanism on said magazine, a carrying table below said magazine having a plurality of apertures therein, and a 95
 95 receiving compartment, said carrying table adapted to simultaneously operate said record releasing mechanism to deposit a record from said magazine on said carrying table and carry the same to the playing table, and 100
 100 transfer a played record from said playing table to said compartment.
13. In a device of the class described the combination of an apertured transfer table, a record playing table therebeneath, a magazine for records above said transfer table, and a receiving compartment below said 105
 105 transfer table, of reproducing means associated with said playing table, adapted to play the records thereon. 110
 110
14. In a record playing machine of the class described a record container, a record playing table, and pocketed means adapted to be rotated for sweeping records from 115
 115 said container to playing position upon said table.
15. In a record playing machine of the class described a record playing table, a record receiving compartment, and revolving apertured means adapted to engage and 120
 120 sweep records from said table to a discharge position within said compartment.
16. In a record playing machine of the class described a record container, a record receiving compartment, a record playing 125
 125 table, and rotatable means adapted for si-

multaneously sweeping a record from said container and table to said table and receiving compartment respectively.

17. In a record playing machine of the
5 class described horizontally rotatable pocketed means adapted for simultaneously sweeping records to and from playing position.

18. In a record playing machine of the
10 class described rotatable means adapted for simultaneously sweeping records to and from playing position.

19. In a record playing machine of the class described apertured mechanism rotatably mounted for automatically engaging 15 and changing the records.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

EMIL MILTON CLASEN.

Witnesses:

CHARLES W. HILLS, Jr.,

FRANK K. HUDSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH TONE ARM CONNECTION.

1,243,853 ----- J. Matson.

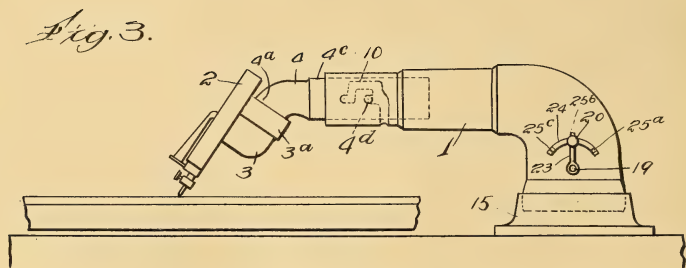
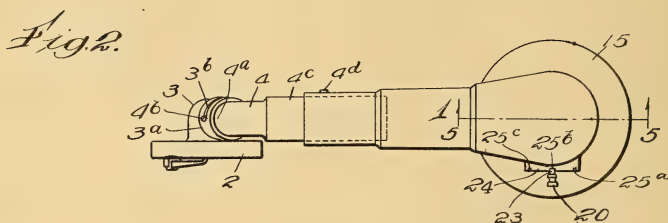
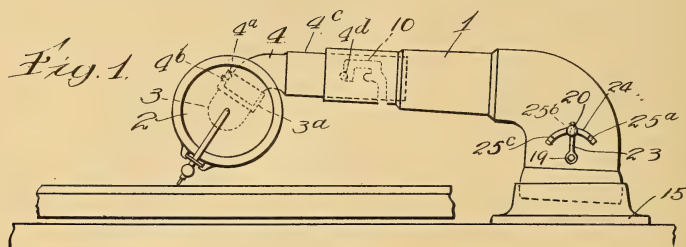
Patented Oct. 23, 1917.

Filed Oct. 14, 1916.

J. MATSON.
 PHONOGRAPH TONE ARM CONNECTION.
 APPLICATION FILED OCT. 14, 1916.

1,243,853.

Patented Oct. 23, 1917.
 2 SHEETS—SHEET 1.



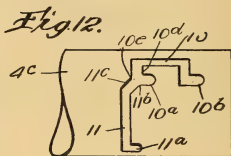
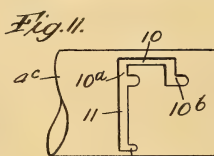
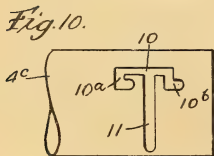
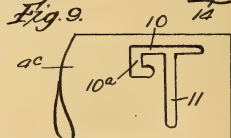
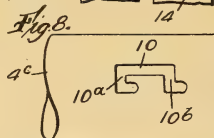
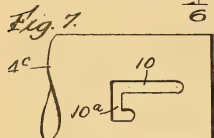
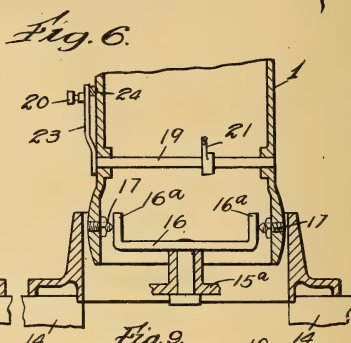
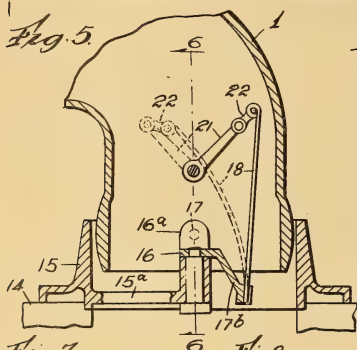
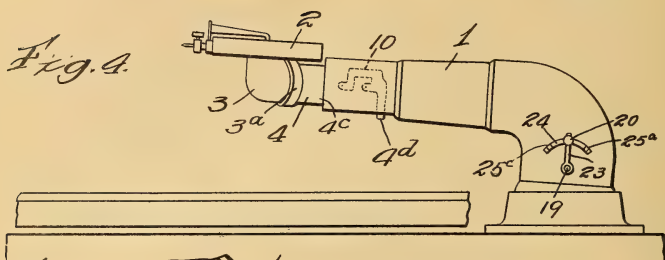
Witnesses,
Oct. 14, 1916

Inventor,
 Julius Matson,
 by *Burton & Burton*,
 his Attys

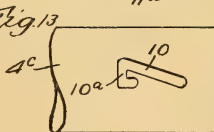
J. MATSON.
 PHONOGRAPH TONE ARM CONNECTION.
 APPLICATION FILED OCT. 14, 1916.

1,243,853.

Patented Oct. 23, 1917.
 2 SHEETS—SHEET 2.



Witnesses.
[Signature]



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UNITED STATES PATENT OFFICE.

JULIUS MATSON, OF GLENWOOD, ILLINOIS, ASSIGNOR TO STEGER & SONS PIANO MANUFACTURING COMPANY, OF STEGER, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH-TONE-ARM CONNECTION.

1,243,853.

Specification of Letters Patent.

Patented Oct. 23, 1917.

Application filed October 14, 1916. Serial No. 125,554.

To all whom it may concern:

Be it known that I, JULIUS MATSON, a citizen of the United States, residing at Glenwood, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonograph-Tone-Arm Connections, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved construction of the tone arm of a phonograph or talking machine, particularly with respect to its connections for swinging over the record and toward and from the record and with respect to the mounting of the sound box thereon for various adjustments of the latter. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of a portion of a phonograph comprising a tone arm and sound box, and embodying the features of this invention.

Fig. 2 is a top plan view of the structure shown in Fig. 1.

Fig. 3 is a side elevation of a portion of the tone arm and sound box having the sound box adjusted to a different position from that shown in Fig. 1.

Fig. 4 is a similar view showing the sound box in a third position, namely, for receiving the stylus.

Fig. 5 is a vertical section at the line, 5—5, on Fig. 2.

Fig. 6 is a section at the line, 6—6, on Fig. 5.

Figs. 7, 8, 9, 10, 11, 12, and 13 are detail views of a telescopic connection between the tone arm and the sound box elbows, showing a variety of forms of a slot in one of the telescopically-interfitting members for permitting the various adjustments of said joint and locking the members at the various positions in such adjustment.

In the structure shown in the drawings, 1 represents the tone arm, 2 the sound box. 3 is an elbow having one end connected to the sound box at the usual position, namely, at the center of the back of the sound box, and having the other arm extending upward obliquely in a plane parallel to the plane of the sound box,—that is, parallel to the plane

of the diaphragm therein. 4 is a second elbow whose two arms are at an obtuse angle, one arm being interfitted with the obliquely-extending arm of the elbow, 3, and the other arm being telescopically interfitted with the free end of the tone arm, 1. The obliquely-extending arms, 3^a, of the first elbow, and 4^a, of the second elbow are interfitted with each other for relative rotation about their common axis for the purpose of adjusting the sound box at will to either of two positions, to-wit: a position such as shown in Figs. 1 and 2, holding the stylus at the proper position for coöperating with the records of the type having laterally undulatory grooves, and the position shown in Fig. 3 for holding the stylus at the proper position for coöperating with the record having the "hill-and-valley" type of groove. For the purpose of this adjustment the two oblique arms of said elbows are connected by a pin, 3^b, in the oblique arm, 3, which is the inner one of the two, engaging a circumferentially-extending slot, 4^b, in the arm, 4^a, said slot extending for about ninety degrees around the arm in which it is formed so as to permit a substantially ninety-degree change of position of the sound box for the purpose indicated.

It will be observed that in the change of position of the sound box from that at which the stylus is positioned for coöperating with a record of the first mentioned type to the position for coöperation of the stylus with the record of the second mentioned type, by reason of the fact that the axis about which the sound box is turned in this adjustment is offset laterally from the vertical plane in which the stylus extends and is inclined, the point of the stylus is carried away from the vertical axis about which the tone arm swings in its movement over the record; that is to say, this change of position of the sound box increases the radius of the arcuate path of the stylus over the record. Inasmuch as the most perfect coöperation of the stylus over the record requires that the path of the stylus should be as nearly as possible radial with respect to the record, that is, that the chord of the arc of its path over the record should be substantially radial to the latter, it will be seen that this change of radius-length involved in the adjustment of the sound box from one position to the other, is liable to

operate disadvantageously for playing either with one type of record or the other, if the radius length for either one of them is correct in accordance with the above-stated requirement. In providing for this adjustment of the sound box to the two positions to accommodate the two types of record, it becomes desirable therefore to provide in some way for compensating for this change of radius length. This is effected by means of the telescopically inter-fitting connection between the arm, 4^a of the elbow, 4, and the tone arm, 1, said telescopically-interfitting connection being constructed for permitting relative longitudinal movement of the two interfitting parts,—that is, for the movement of the elbow member in and out along the length of the tone arm. For the purpose of this longitudinally-telescoping movement, the arm, 4^a, of the elbow, 4, is connected to the tone arm by means of the pin, 4^d, rooted in said arm, 4^a, and engaging a slot in the tone arm. This slot may have a variety of forms, several of which are illustrated, but in all cases it comprises a longitudinally-extending main part, 10, and an angle-shaped notch, 10^a, at one end of the part, 10. It will be observed that in either position of the sound box and stylus, the travel of the record exerts a pull the tendency of which would be to extend the tone arm at said telescopic connection; and it is important therefore that the connection between the two telescoped parts, or their connection together at that joint should be such that at either position this tendency to extend should be resisted. This requires that the pin, 4^d, should be in a position to be pulled against an end of the slot in the tone arm at both positions. This will be the condition normally at the position at which the pin is at the forward or outer end of the slot, but except for provision to the contrary, it would not be the condition when the pin is at the other end of the slot. In order to produce the condition stated at said other end of the slot,—that is, at the position at which the sound box is adjusted with the shorter radius, the main slot, 10, is provided with the angle-shaped notch, 10^a, at the rear or inner end, the return bend of the angle in that case constituting the end of the slot against which the pin is stopped when the joint is adjusted to a shorter radius. This form of slot, which is the simplest which is adequate for accomplishing the purpose stated, may be seen in Fig. 7. It will be observed that when the slot is in this form, there will be caused an angular change of position of the sound box in changing from one adjustment to the other due to the fact that the forwardly-extending end of the notch, 10^a, is laterally out of line with the forward end of the main portion,

10, of the slot. Except as this defect might be compensated by the relative rotary adjustment of the two members at the joint between the two elbows, it would tend to cause the stylus in one position or the other to be inclined laterally, which is undesirable. It is therefore preferable to employ an angle-shaped notch at the forward end of the main slot, 10, as well as at the rear end; and in the form of the slot shown in Fig. 8, an additional angle-shaped notch is shown at 10^b. It will be observed that for the purpose mentioned, namely, preventing longitudinal displacement of the parts by the drag upon the stylus, without defeating the function of the slot performed by the engagement of the pin with the sides of the slot,—that is, preventing rotary movement of the two parts,—it is necessary that the notches referred to should be of the angle form described so that at the operative position in each the pin may be engaged between two sides of a slot which shall prevent the relative rotary movement of the two parts. The angle-shaped slot, 10^b, added for the purpose of bringing the two stopped positions of the pin into alinement directly longitudinally of the tone arm, may be avoided by inclining the main slot, 10, as seen in Fig. 13, so that the forward end without the addition of the angle shaped notch is in such alinement with the end of the angle-shaped notch, 10^a.

The telescopic joint between the tone arm and the elbow, 4, is adapted to another purpose beside the extension of the parts, by means of the supplemental branch, 11, which is added to the slot above described, said supplemental branch extending circumferentially in the tone arm and terminating at a point about ninety degrees around from the main portion, 10, of the slot;—that is, so that the pin following this supplemental branch from the main slot can traverse substantially ninety degrees of the tone arm. This permits the sound box to be swung through ninety degrees about the axis of the tone arm from either of its operative positions to reach a position convenient for inserting and removing the stylus. In order to render the tone arm secure against the liability to swing back from this stylus-inserting position, so that the operator's hands may be entirely free for adjustment of the stylus and not be obliged to hold the sound box in position while doing so, the branch, 11, is terminated in a forwardly-extending notch, 11^a, in which the pin is engaged by pulling the sound box forward after having swung it around to the position indicated. This supplemental branch slot, 11, may extend off from the main slot at any convenient point in the length thereof, including the notches, 10^a and 10^b. In Fig. 9 it is shown extending off from a slot of the form

which is shown in Fig. 7 at about the middle point in the length of that slot. In Fig. 10 it is shown extending off at the same point from a slot of the form shown in Fig. 8, that is, one having both the angle-shaped notches, 10^a and 10^b. In Fig. 11 it is shown extending off from the circumferentially-extending member of the angle-shaped notch, 10^a. It is obviously immaterial which way the notches, 10^a and 10^b, are offset from the main slot, 10, but it is material that the supplemental branch slot, 11, should extend off from the main slot in the direction which will cause the sound box to be turned face-upward and not face-downward in using said branch slot. In all the forms shown the angle slots, 10^a and 10^b, are shown offset from the main slot, 10, at the side toward which it is necessary that the branch slot, 11, should extend for the reasons stated, but this is not essential. In Fig. 12 is shown a slight modification of the slot from the form shown in Fig. 11, consisting in extending the branch slot, 11, off obliquely from the angle of the angle-shaped notch, 10^a, instead of making it open directly behind the notch. The reason for this special form is that when it is employed the pin will encounter a stop at each point at which a change of direction should be made in adjusting the device in all the adjustments in which the pin has to pass to or from the notch, 10^a, or the supplemental branch slot, 11, and the operator is thus warned to make the change in the direction necessary for whatever adjustment he is making, and is therefore less liable to make the wrong adjustment inadvertently. It will be seen that the pin moving out from the main slot, 10, will encounter the angle or corner, 11^b, and the operator will then be warned either to turn into the forwardly extending member of the notch, 10^a, or to turn in the other direction to enter the branch, 11. Likewise, in moving out of the branch, 11, the pin will first encounter the shoulder, 11^c, and one will be warned to change the direction of movement to cause the pin to traverse this oblique shoulder, 11^c, which will bring the pin into collision with the angle or corner, 10^d, suggesting a change of direction of movement either to cause the pin to pass into the main slot or to pass into the forwardly-extending portion of the angle slot, according to which adjustment of the sound box it is intended to make. Likewise, in passing out of the forwardly-extending portion of the angle slot, 10^a, the pin will encounter the corner, 10^e, and one will thereby be warned either to move to the right into the main slot, or into the left into the oblique slot according to his purpose in the adjustment which he is making. The form of slot shown in Fig. 12 is therefore the form preferred for maximum efficiency and widest adaptation.

It is known that for the most effective and perfect reproduction of music, either vocal or instrumental, as well as for the most perfect reproduction of articulate sounds of the human voice, whether in song or speech, the proper adjustment of the weight or pressure of the stylus upon the record to the character of the record is essential, and that a poor reproduction results from either too great or too little weight or pressure of the stylus upon the record. The normal weight of the sound box and tone arm pivoted for swinging vertically toward and from the record, when the pivot for such swinging movement is substantially at the vertical line of the pivoting of said arm for swinging horizontally over the record, is usually in excess of the weight necessary for producing the maximum desirable pressure upon the record; and for the purpose of offsetting the necessary proportion of this weight, a counterpoising spring may be connected with the arm. In the structure shown in the drawing, the construction for pivoting the tone arm for both its swinging movements comprises a plate, 15, mounted upon the top of the table, 14, on which the record carrier is supported in a familiar manner not necessary to be shown or described, said plate forming the upper end of the vertical throat or downwardly-extending portion of the sound conduit not further illustrated, and having therefore an aperture corresponding in diameter to that throat, which aperture is bridged by a spider, 15^a, at the center of which there is pivoted for turning horizontally a yoke, 16, to whose up-turned ends, 16^a, the tone arm is pivoted by means of cone-pointed pivot screws, 17, 17, set in through the tone arm at diametrically opposite points for engaging said up-standing lugs of the yoke. The yoke has a short arm 17^b, projecting off from the middle point of its length, to the end of which there is secured in any convenient manner the lower end of a flat spring or spring bar, 18, which extends up within the downwardly-extending elbow member of the tone arm. In the tone arm a little above its pivot to the yoke there is mounted a rock shaft, 19, which extends out through the tone arm at one side, provided with an operating means, as for example the knob, 20, for rocking it. Inside the tone arm the rock shaft has a lever arm, 21, extending up in the same general direction as the spring, 18, and connected to the latter by a short link, 22. Outside the tone arm the rock shaft has an index and locking finger, 23, which extends up alongside the downwardly-extending member of the elbow of the tone arm close alongside the latter in position to play over a notched segment, 24, which is formed or mounted rigidly upon the side of the tone arm. This index finger or lever arm has some elasticity

so that it is adapted to snap into the notches, 25^a, 25^b and 25^c, formed in the notched segment, and thereby lock the rock shaft at the position at which it may be rocked for tensioning the spring, 18, more or less according to the requirement for adapting it to compensate more or less of the weight of the tone arm so as to produce the proper amount of pressure of the stylus upon the record. In practice for various records on the market three degrees of pressure are found adequate and the segment is therefore provided with three notches only, though a greater number may be provided if intermediate adjustments are found desirable. The knob or handle, 20, is preferably at the end of the index and locking finger, 23, so that the operator can use it to spring the finger, 23, out of its locking engagement with the segment whose notches may therefore be made square shouldered for positive engagement of the locking finger.

I claim:—

1. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot trending generally longitudinally of the tone arm and having both end portions pointing in the same longitudinal direction for stopping the pin against pull in that direction when it is at either end of the slot.

2. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot having portions at the opposite ends extending longitudinally

of the tone arm and having said ends directly aligned longitudinally of the tone arm.

3. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot comprising a main part extending longitudinally and a notch opening off laterally from said main part at one end thereof for entrance of the pin therinto and turning back toward the other end of the main slot.

4. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot comprising a main part extending longitudinally and notches opening off laterally from said main part at each end thereof for entrance of the pin therinto, and trending at their terminal part in the same longitudinal direction, said notches terminating in alignment longitudinally of the tone arm.

5. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said inter-

fitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot comprising a main part extending longitudinally and a supplemental portion extending from said main part circumferentially substantially ninety degrees and terminating with the notch extending off from said circumferential part longitudinally.

6. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot comprising a main part extending longitudinally, notches opening off laterally from said main part and terminating in a longitudinal direction the supplemental portion extending circumferentially substantially ninety degrees and terminating in a longitudinally-extending notch.

7. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot comprising a main part extending longitudinally, a notch leading off laterally from said main part and terminating longitudinally, and a supplemental portion leading off from said notch and extending circumferentially to a point approximately ninety degrees around from the main portion and terminating with a notch extending longitudinally.

8. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising an elbow member joining the sound box at one end and having the other end extending obliquely upward; a second elbow member having one arm telescopically interfitting with the tone arm for longitudinal movement, and the other arm at an obtuse angle to the first and interfitting with the oblique arm of the first mentioned elbow for relative rotary movement of said interfitting oblique arms about their common axis, the telescopically interfitting parts having one a pin and the other a slot engaged by the pin, said slot comprising a main part extending longitudinally, a notch leading laterally from said main part and then terminating longitudinally and a supplemental portion leading off from said notch obliquely therefrom, for a short distance and then extending circumferentially to a point approximately ninety degrees around from the main portion and terminating with the notch extending longitudinally.

9. In a phonograph a tubular tone arm mounted for swinging to carry the sound box over the record, in combination with such sound box and its sound conduit connections with the tone arm, said connections comprising joints by which the sound box may be adjusted to two positions for cooperating with different types of record, said joints comprising a telescopic joint between the tone arm and an adjacent member of the conduit at which said adjacent member is adapted to receive both longitudinal and rotary movement with respect to the tone arm, the telescopically-interfitting parts at such joint having one a pin and the other a slot engaged with the pin, the slot having longitudinally-extending and circumferentially-extending portions, and having terminals in which respectively the pin stands for holding the sound box in two playing positions and out of playing position, said slot having changes of direction producing stop shoulders for impeding the continuance of movement of the pin in the direction for colliding with such stop shoulders at the several points at which the direction of movement is to be changed from rotary to longitudinal or the reverse for reaching the desired terminal.

In testimony whereof, I have hereunto set my hand at Steger, Ill., this 7th day of October, 1916.

JULIUS MATSON.

PHONOGRAPH TONE ARM CONNECTION.

1,243,854 ----- J. Matson.

Patented Oct. 23, 1917.

Filed Apr. 23, 1917.

J. MATSON.
 PHONOGRAPH TONE ARM CONNECTION.
 APPLICATION FILED APR. 23, 1917.

1,243,854.

Patented Oct. 23, 1917.

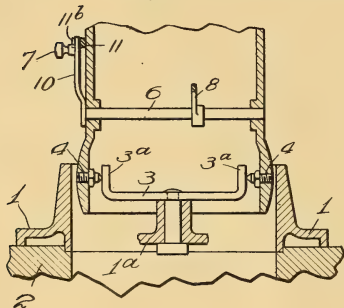
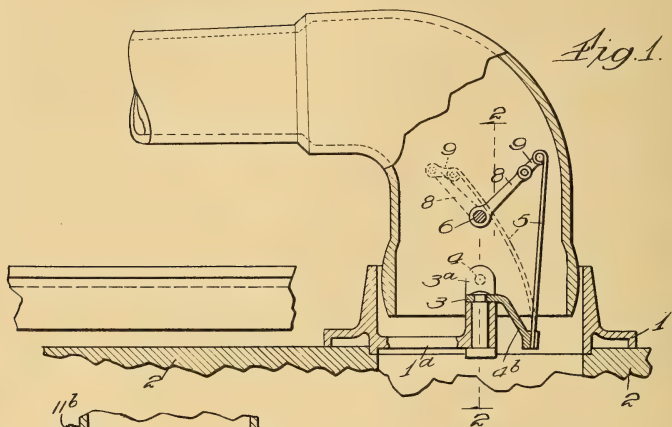
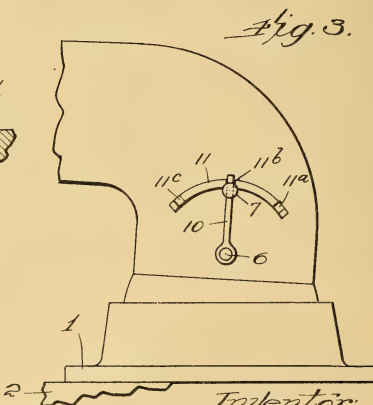


Fig. 2.



Witness:
O. S. Glumet

Inventor:
 Julius Matson,
 by *Burton Burton*
 his Atty.

UNITED STATES PATENT OFFICE.

JULIUS MATSON, OF GLENWOOD, ILLINOIS, ASSIGNOR TO STEGER & SONS PIANO MANUFACTURING COMPANY, OF STEGER, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH-TONE-ARM CONNECTION.

1,243,854.

Specification of Letters Patent.

Patented Oct. 23, 1917.

Original application filed October 14, 1916, Serial No. 125,554. Divided and this application filed April 23, 1917. Serial No. 163,787.

To all whom it may concern:

Be it known that I, JULIUS MATSON, a citizen of the United States, residing at Glenwood, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonograph-Tone-Arm Connections, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This application is a division of my application No. 125,554, filed October 14, 1916, and now pending, for improvement in phonograph tone arm connections.

The purpose of the present invention is to provide an improved construction of the tone arm of a phonograph or talking machine and its mounting, particularly with respect to its connections for swinging over the record and toward and from the record, and for counter-balancing any excess of weight of the tone arm causing undue pressure of the stylus upon the record. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a partly sectional side elevation of a portion of a phonograph comprising the tone arm and its mount, section being made axially with respect to the tone arm at the vertical plane of the axis about which it swings horizontally.

Fig. 2 is a section at the line, 2—2, on Fig. 1.

Fig. 3 is a detail side elevation of the elbow portion of the tone arm, showing an exteriorly-accessible device for adjusting the tension of the counter-balancing spring.

It is known that for the most effective and perfect reproduction of music, either vocal or instrumental, as well as for the most perfect reproduction of articulate sounds of the human voice, whether in song or speech, the proper adjustment of the weight or pressure of the stylus upon the record to the character of the record is essential, and that a poor reproduction results from either too great or too little weight or pressure of the stylus upon the record. The normal weight of the sound box and tone arm pivoted for swinging vertically toward and from the record, when the pivot for such swinging movement is substantially at the vertical

line of the pivoting of said arm for swinging horizontally over the record, is usually in excess of the weight necessary for producing the maximum desirable pressure upon the record; and for the purpose of offsetting the necessary proportion of this weight, a counterpoising spring may be connected with the arm. In the structure shown in the drawing, the construction for pivoting the tone arm for both its swinging movements comprises a plate, 1, mounted upon the top of the table, 2, on which the record carrier is supported in a familiar manner not necessary to be shown or described, said plate forming the upper end of the vertical throat or downwardly-extending portion of the sound conduit not further illustrated, and having therefore an aperture corresponding in diameter to that throat, which aperture is bridged by a spider, 1^a, at the center of which there is pivoted for turning horizontally a yoke, 3, to whose up-turned ends, 3^a, the tone arm is pivoted by means of conepointed pivot screws, 4, 4, set in through the tone arm at diametrically opposite points for engaging said up-standing lugs of the yoke. The yoke has a short arm, 4^b, projecting off from the middle point of its length, to the end of which there is secured in any convenient manner the lower end of a flat spring or spring bar, 5, which extends up within the downwardly-extending elbow member of the tone arm. In the tone arm a little above its pivot to the yoke there is mounted a rock shaft, 6, which extends out through the tone arm at one side, provided with an operating means, as for example the knob, 7, for rocking it. Inside the tone arm the rock shaft has a lever arm, 8, extending up in the same general direction as the spring, 5, and connected to the latter by a short link, 9. Outside the tone arm the rock shaft has an index and locking finger, 10, which extends up alongside the downwardly-extending member of the elbow of the tone arm close alongside the latter in position to play over a notched segment, 11, which is formed or mounted rigidly upon the side of the tone arm. This index finger or lever arm has some elasticity so that it is adapted to snap into the notches 11^a, 11^b, and 11^c, formed in the notched segment, and thereby lock the rock shaft at the position at which it may be rocked for tension-

ing the spring, 5, more or less according to the requirement for adapting it to compensate more or less of the weight of the tone arm so as to produce the proper amount of pressure of the stylus upon the record. In practice for various records on the market three degrees of pressure are found adequate and the segment is therefore provided with three notches only, though a greater number may be provided if intermediate adjustments are found desirable. The knob or handle, 7, is preferably at the end of the index and locking finger, 10, so that the operator can use it to spring the finger, 10, out of its locking engagement with the segment whose notches may therefore be made square shouldered for positive engagement of the locking finger.

I claim:—

1. In a phonograph, in combination with a tone arm, a supporting member to which the tone arm is pivoted for swinging vertically, a sound conduit member upon which said supporting member is pivotally mounted for turning horizontally; a spring secured to said supporting member and extending transversely thereof within the tone arm, and means mounted in the tone arm for connecting the remote end of the spring with the tone arm, said means being exteriorly accessible and movable in the tone arm for varying the tension of the spring.

2. In a phonograph, in combination with a tone arm, a supporting member to which the tone arm is pivoted for swinging vertically, a sound conduit member upon which said supporting member is pivotally mounted for turning horizontally; a spring attached at one end to the supporting member extending within the tone arm transversely of the axis of the vertical swinging movement thereof; a rock shaft mounted in the tone arm having a lever arm extending off therefrom within the tone arm in the general direction in which the spring extends; a link connecting said lever arm to the spring, the rock shaft having exteriorly of the tone arm

means for rocking it and means for securing the rock shaft at a plurality of positions within the range of its rocking movement.

3. In a phonograph, in combination with a tone arm, a supporting member to which the tone arm is pivoted for swinging vertically, a sound conduit member upon which said supporting member is pivotally mounted for turning horizontally; a spring attached at one end to the supporting member extending within the tone arm transversely of the axis of the vertical swinging movement thereof; a rock shaft mounted in the tone arm having a lever arm extending off therefrom within the tone arm in the general direction in which the spring extends; a link connecting said lever arm to the spring; the rock shaft being extended to the exterior of the tone arm; an index finger thereon outside the tone arm and means for securing the rock shaft at a plurality of positions indicated by the index finger.

4. In a phonograph, in combination with a tone arm, a supporting member to which the tone arm is pivoted for swinging vertically, a sound conduit member upon which said supporting member is pivotally mounted for turning horizontally; a spring attached at one end to the supporting member extending within the tone arm transversely of the axis of the vertical swinging movement thereof; a rock shaft mounted in the tone arm having a lever arm extending off therefrom within the tone arm in the general direction in which the spring extends; a link connecting said lever arm to the spring, the rock shaft having exteriorly of the tone arm a lever arm and a notched segment on the exterior of the tone arm concentric with the rock shaft having a plurality of notches for engaging the lever arm with the rock shaft to lock the rock shaft at adjusted position.

In testimony whereof I have hereunto set my hand at Steger, Illinois, this 19 day of April, 1917.

J. MATSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,243,980 ----- E. Rogers.
Patented Oct. 23, 1917,
Filed May 15, 1915.

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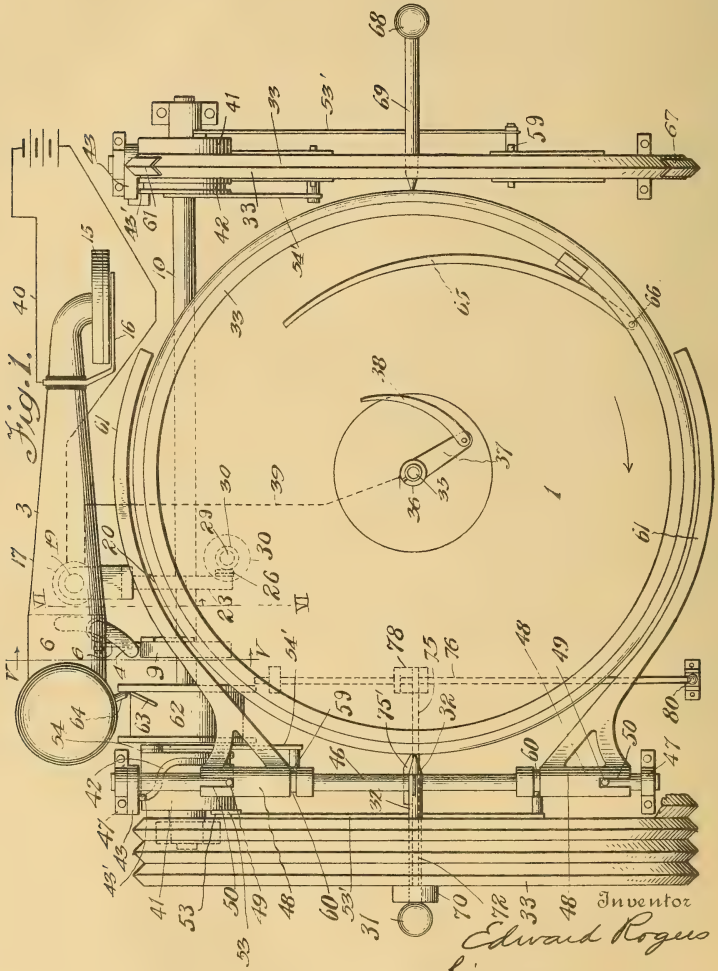
E. ROGERS.
PHONOGRAPH.

APPLICATION FILED MAY 19, 1915.

1,243,980.

Patented Oct. 23, 1917.

3 SHEETS-SHEET 1.



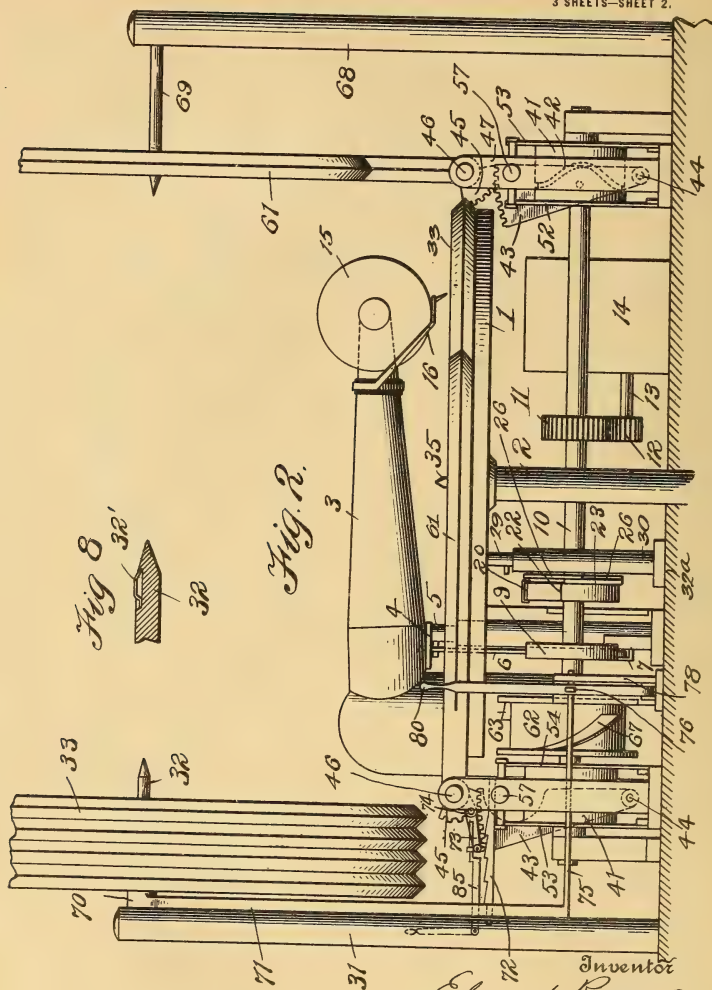
Inventor
Edward Rogers
By *Wm. A. Courtland* Attorney

PHONOGRAPH.

Patented Oct. 23, 1917.

3 SHEETS—SHEET 2.

1,243,980.



Inventor

Edward Rogers

By his Attorney
Wm. A. Courtland

E. ROGERS.

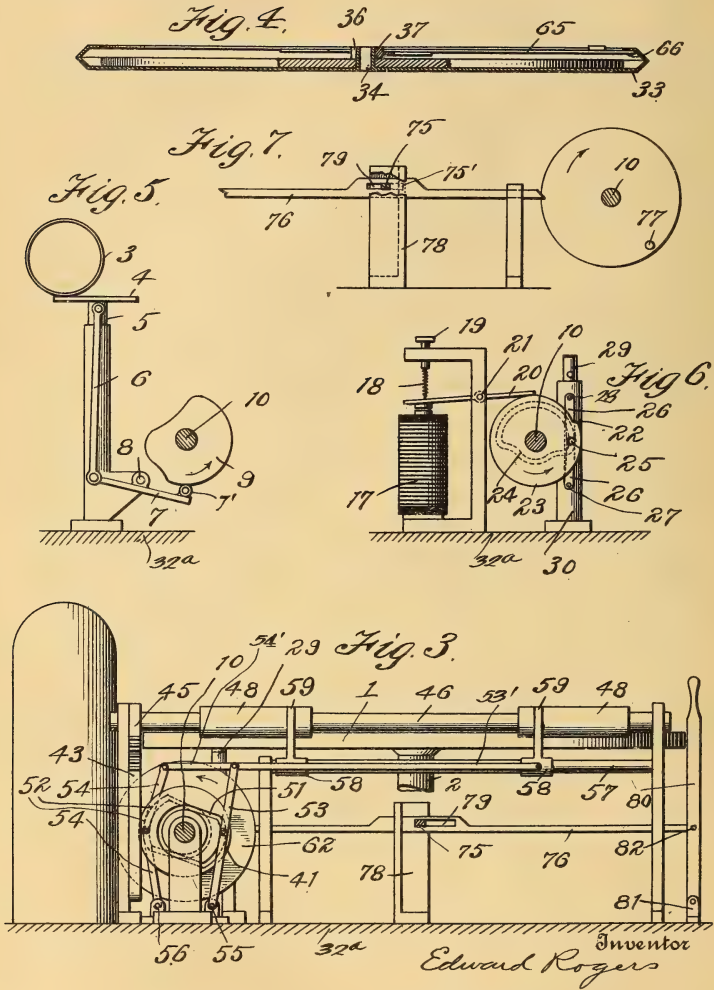
PHONOGRAPH.

APPLICATION FILED MAY 19, 1915.

1,243,980.

Patented Oct. 23, 1917.

3 SHEETS—SHEET 3.



Inventor
Edward Rogers
By his Attorney
W. A. Courtland

UNITED STATES PATENT OFFICE.

EDWARD ROGERS, OF ROSEDALE, NEW YORK, ASSIGNOR OF ONE-HALF TO WILLIAM A. COURTLAND, OF BROOKLYN, NEW YORK.

PHONOGRAPH.

1,243,980.

Specification of Letters Patent.

Patented Oct. 23, 1917.

Application filed May 19, 1915. Serial No. 29,109.

To all whom it may concern:

Be it known that I, EDWARD ROGERS, a citizen of the United States, residing at Rosedale, borough of Queens, and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates to phonographs and has for its primary object to provide an improved construction, combination and arrangement of parts in an instrument of this character whereby a plurality of disk records can be played thereon in succession without the intervention of an operator.

One of the objects of the present invention is to provide improved means which will automatically remove a record from the turn table of the phonograph as soon as such record has been completed and replace it with the next record, in order. A subsidiary object of the invention is to provide record holders of improved construction which are adapted to automatically start the reproducing needle at the beginning of the records and control the removal of said records from the turntable. Other and further objects, including certain features of construction will appear in the specification and be pointed out in the appended claims, reference being had to the accompanying drawings which show the preferred embodiment of my invention and in which—

Figure 1 is a plan view of a phonograph constructed in accordance with the principles of my invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is a side elevation at right angles to Fig. 2, parts being removed and parts shown in section;

Fig. 4 is a sectional view of one of the record holders;

Fig. 5 is a detail section on the line V—V, Fig. 1;

Fig. 6 is a detail section on the line VI—VI, Fig. 1;

Fig. 7 is a fragmentary detail in elevation;

Fig. 8 is a fragmentary detail on an enlarged scale.

In the embodiment of my invention shown on the drawings, the turn table 1 for carrying records to be played, surmounts a vertical spindle 2 which may be rotated in any desired manner. A sound arm 3 is suitably mounted to swing up and down about an

axis at its larger end and to be oscillated about a vertical axis which intersects the first mentioned axis. As shown best in Fig. 5, a disk-like plate 4, which surmounts a vertically reciprocable plunger 5, engages the sound arm or tube 3 and is adapted to impart the up and down movement to said tube by a connecting rod 6 which has its upper end pivotally connected to said plunger and its lower end pivotally connected to a cam lever 7 which is oscillated about a pivot 8 by a cam 9 mounted on the drive shaft 10. 7' is a cam roller mounted on the end of lever 7 and adapted to engage cam 9. The drive shaft 10 carries a gear 11 which meshes with a pinion 12 on the spindle 13 of a motor 14. The speed of motor 14 is such that shaft 10 makes one revolution in approximately eight seconds thereby giving the several cam controlled parts ample time to sequentially move into and out of position without interference. A sound box 15 is mounted on the outer end of sound arm 3 and carries a conductor 16 which is adapted to complete an energizing circuit (to be hereinafter pointed out) for a magnet 17 (see Fig. 6). Magnet 17 together with a spring 18 suspended from an adjustable screw 19, serves to oscillate a stop bar 20 about its axis 21. When the magnet is de-energized, said stop bar is acted on by spring 18 to engage the shoulder 22 of a cam 23 which is provided with a cam slot 24 within which runs a cam roller 25 carried by the knuckle joint of a pair of toggle levers 26. The lower toggle lever is mounted on a fixed pivot 27 while the other lever is pivotally connected at 28 to a brake bar 29 which is reciprocally mounted in a standard 30. This brake bar is suitably disposed to engage the table 1 whenever the cam roller 25 follows into the inner run of the cam slot 24 subsequently to the cam 23 being released by energization of the magnet 17. Referring now to Figs. 1 and 2, a post 31 projects upwardly from the base board 32. Projecting inwardly from the post 31 is a pointed rod 32 which carries a plurality of record holders 33. As shown in Fig. 4, the preferred form of record holder comprises a shell or housing 33 with a beveled periphery and a central tubular post 34 which fits the rotary post 35 at the center of the record carrying table 1. After a record has been placed in the holder 33, an annulus 36 is placed over

the hollow post 34 and rests upon said record. As shown best in Fig. 1, a radial arm 37 carries at its outer end an arcuate contact 38 which may be adjusted to correspond with the innermost record groove on that particular record. One pole of the magnet 17 is electrically connected with the annulus 36; preferably by a wire 39 and post 35. The other pole of said magnet may be electrically connected to the tone arm 3 through the metallic parts of the machine or by a wire 40. It will be seen, therefore, that whenever the inward movement of the sound arm 3 brings the conductor 16 into engagement with the contact 38, the energizing circuit of magnet 17 will be completed and the drive 10 released for a single revolution. This single revolution of the drive shaft 10 effects a series of operations, during which the turn table is stopped, the played record removed, another record installed, and the turn table started again, the sound arm 3 being swung out and in at the proper times and the needle started gently on each record.

Referring now to Figs. 1 and 2, the shaft 10 has mounted thereon at opposite ends, the cams 41. In the faces of each of these cams is a groove 42 which operates a cam roller 43' on the segmental gear 43. Each of said segments 43 swings about a pivot 44 and meshes with a segmental pinion 45 which is keyed to a shaft 46 journaled in suitable standards 47. Sleeves 48 are reciprocable on shaft 46 but held against turning thereon by pins 49 which extend through longitudinal slots 50 in the sleeves 48. In the opposite side walls of each of the cams 41, are the cam grooves 51 and 52 which respectively control the swinging movements of levers 53 and 54 (see Fig. 3) about the fixed pivots 55 and 56. The free ends of these levers are pivotally connected to bars 53' and 54' which bars are in turn pivotally connected to levers 59. As shown in Fig. 3, a guide rod 57 slidably supports the hub portions 58 of a pair of lever arms 59. Said arms project into the grooves 60 in sleeves 48 on opposite sides of the shaft 46. Carried by the sleeves 48 are the arcuate arms 61 which as shown in Figs. 1 and 2 conform to the peripheries of the record holders 33 and in lowered position are disposed a slight distance above the upper surface of the turn table 1. As shown in Figs. 1 and 2, a flanged cam 62 mounted on shaft 10 carries a cam bar 63 which is attached to the body of the cam, extends away from one flange toward the other and has its peripheral surface the same diameter as the cam flange, in the same manner as cam bar 67. This cam bar is adapted to engage a projection or cam pin 64 carried by the sound arm 3 to swing it into position so that the needle carried by the sound box 15 will engage a curved guide 65 which traverses the surface of the record and is adjustable about a pivot 66 on the periphery of each of the record holders 33 and is directed to the outermost groove in the record contained in each holder. The free end of the guide 65 is placed directly above the outermost groove of the record so that when the tone arm is swung over the record and given its first drop the needle will engage the guide 65 and be carried directly to the outermost groove after which the tone arm will be again dropped and the needle rest in said outermost groove. Also carried by the cam 62 is a cam bar 67 which is adapted to swing the sound arm 3 outwardly after a record has been played. This is accomplished in the following manner: When the cam bar 63 moves the cam pin 64 on tone arm 3 across the face of cam 62; the tone arm will be moved over the record and into position to have the needle engage the guide 65 and direct said needle to the outermost record groove. The tone arm will, as the record grooves control it, move toward the center of the record thereby causing cam pin 64 to move to the opposite side of cam 62, so that when shaft 10 is released cam 62 will rotate causing cam arm 67, see Fig. 2, to engage cam pin 64 and swing tone arm 3 off the record at the same time restoring cam pin 64 to the position shown in Fig. 1. A post 68 mounted oppositely to the post 31, carries an inwardly extending spur 69 which receives the record holders as they are taken from the turn table by the arcuate grippers 61 on that side of the machine. Obviously the record holders will be moved along the spur 69 by the one by one addition to the holders carried thereby. The spur 32, however, is provided with a sleeve 70 (see Fig. 2) which slides on said spur to force the record holder 33 which is nearest to the turn table, into position to be gripped by the grippers. For this purpose, a bar 71 depends therefrom and has secured thereto a ratchet bar 72 which is fed inwardly by a pawl 73 pivotally mounted on a lever arm 74 carried by shaft 46. It will be seen, therefore, that each movement of the shaft 46 accomplishes the removal of one record holder from spur 32 and a displacement of the remaining record holders a corresponding amount toward the turn table. An inwardly projecting bar 75 carried by the bar 71, is provided on one side with a cam 75' which as shown in Figs. 1, 3 and 7 is adapted to engage the stop bar 76 and move said stop bar into and out of the path of pin 77 carried by the cam 62 on shaft 10. As shown in Fig. 1 the cam 75' is preferably an enlargement on one side of bar 75 and is adapted to be projected through an opening 79 when said bar 71 is moved forward a sufficient distance to place the last record holder in position to be removed by the grippers from the spur 32. The cam 75' engages

the wall of the opening 79 and moves the stop bar 76 into position to engage the stop pin 77. 78 is a standard which reciprocally supports bar 76 and cam bar 75. Stop bar 76, as shown in Figs. 2 and 3, is also controlled manually by means of a lever 80 which is pivotally mounted on a fixed block 81 and pivotally connected at 82 with the bar 76. As shown in Fig. 8, the spur 32 is provided with a recess within which is disposed a spring 32' to impart a slight resistance to a record holder being removed from the spur 32.

Fig. 1 shows the machine with shaft 10 in operation, just after a record holder has been placed on the turn table and the grippers freed and about to rise. The several other figures of the drawings show positions corresponding to Fig. 1. Assuming the parts to be in the position shown in Fig. 1, it will be noticed that the grippers which deposit the receptacle on the turn table, have been opened by the side cam groove in cam 62, see Fig. 3, and cam groove 42 is acting on cam roller 43' to move segment 43 and thereby raise the grippers 61. Immediately the grippers 61 start upward cam bar 63 on cam 62 engages cam pin 64 and swings the tone arm over the record under the upwardly moving grippers, at the same time cam roller 25 will move into the inner run of cam slot 24 in cam 23, see Fig. 6, and withdraw brake bar 29 and allow the turn table to rotate. After the tone arm passes over the record, cam 9, see Fig. 5, will have reached the first step and allowed the tone arm to drop far enough to have the needle catch against the side of guide 65 and direct said needle to the outermost groove. Continued rotation of shaft 10 allows roller 7' to gradually ride down to the second step on cam 9 and place the needle in the outermost groove of the record. During these operations grippers 61 have been lifted by cam 41 to vertical position where they close on another receptacle, which has been moved to proper position on spur 32 by means hereinbefore described. After the above operations have occurred shoulder 22 on cam 23 will abut the stop 20 and arrest the rotation of shaft 10. When shaft 10 is arrested by stop 20 the record is placed after which shaft 10 is released whereupon cam 23 will apply the brake, cam 9 will lift the tone arm and cam bar 67 on cam 62 will engage cam pin 64 and swing the tone arm back off the record. When the tone arm is almost free from the record cam 41, on the right side Fig. 1, will lower grippers 61, open them and seize the receptacle and remove it from the table but before it is fully up cam 41, on the left of Fig. 1, will start to lower a receptacle and after placing same on the table will immediately open thereby completing a cycle of operation.

The operation of the mechanism will now be readily understood and briefly related is as follows: The records which it is desired to play in series, are placed in their respective holders, the contact 38 on each holder being adjusted so that the conductor 16 on the sound arm will reach it at the same time that the needle will reach the innermost groove of that record. The curved guide bar 65 is also adjusted so that when the needle strikes it near its pivot 66, said needle will be shifted to the outermost groove of the record. The record holders are then placed on the spur 32. It will be understood that the record holders will hold any size records so that after the machine is once started, no further adjustment is necessary. Hand lever 80 is now drawn outward to release the pin 77 (see Fig. 7) which permits the shaft 10 to revolve until lockbar 20 intercepts the shoulder 22 and again interrupts its movement. As the shaft 10 rotates, cam 63 engages the projection 64 carried by the sound arm 3 and swings said sound arm around until the needle is engaged by guide 65 which leads it to the outermost groove in the record. In the meantime cam 9 has operated cam lever 7 to lower the sound arm 3, said cam being suitably formed to make this movement sufficiently gradual to avoid injury to the record. Prior to this however, the roller 25 (see Fig. 6) has entered the inner run of the cam groove 24 and caused the release of the brake bar 29. Before the roller 25 has time to again reach the outer run of cam groove 24 which would apply the brake, shoulder 22 is intercepted by lock bar 20 and the playing of the record is completed without interruption. When the conductor 16 engages the contact 38, the electric circuit hereinbefore pointed out energizes magnet 17 and causes lock bar 20 to again release the disk 23. Immediately the tone arm is raised and starts to swing clear of the table the brake 29 is applied by roller 25 entering the outer rim of cam groove 24. The application of the brake at the time the tone arm starts to swing clear of the table, is necessary in order to have the table at rest when the receptacle lifting arms 61 take hold of the receptacle to remove the same. Cam grooves 51 and 52 now draw the levers 53 and 54 (on the right hand of Fig. 1) toward the shaft 10, thus causing the clamping arms (which have been previously lowered) to engage the record holder and lift it on to the spur 69. The continued movement of shaft 10 occasions the lowering of the next record-holder from the other side after which the tone arm is again automatically swung into position and lowered to play the next record. As the gripping arms 61 on the left are raised to get a new record-holder, the rack bar is fed inwardly a given amount to

properly locate the record-holder 33 to be gripped by said gripping arms. By the repeated displacements of the bar 75 which partakes of the movements of rack bar 72, the lock bar is eventually moved into position to terminate the movement of the shaft 10. By an inspection of Fig. 5 it will be noted that the downward movement of the sound arm takes place in two stages the latter stage being very gradual, and the several cams being properly timed to have the final gradual drop occur at about the time the needle reaches the inner end of guide 65 on each record holder.

While I have shown and described the preferred embodiment of my invention, obviously various modifications may be made within the spirit of the appended claims.

I claim:

1. In a graphophone, a record carrying table, a plurality of record holders supported in vertical position adjacent said table, means for placing a record holder in horizontal position on the table, a sound arm, means for moving said sound arm into playing position over the record holder, means for moving the sound arm to one side of the record holder after the playing period, and means for removing the record holder from horizontal position on the table to vertical position on suitable supports.

2. A holder for graphophone records adapted to be placed on the table or movable support of a graphophone, said holder being provided with adjustable means for automatically locating the needle of a graphophone at the starting point of a record within said holder.

3. A holder for graphophone records provided with means for centering records, means adjustable to correspond to the size of a record to be placed in said holder, for guiding the needle to the first groove, and means carried by said holder, and adapted to be adjusted in position to be engaged by a member carried by the sound arm of the graphophone at the conclusion of a record.

4. A holder for graphophone records adapted to receive records of different sizes and to locate them properly on the movable support of a graphophone and a guide adjustably mounted adjacent the periphery of said holder for guiding a needle to the starting point of a record contained therein.

5. A holder for graphophone records adapted to receive records of different sizes and to locate them properly on the movable support of a graphophone, a guide adjustably mounted adjacent the periphery of said holder for guiding a needle to the starting point of a record contained therein, and a contact adjustably mounted adjacent the center of said holder and adapted to be engaged by the sound arm of a graphophone near the end of said record.

6. The combination with the rotary support or table of a graphophone, of a movable sound arm carrying a needle, a record holder, adapted to be moved into and out of position on said rotary support or table, and to properly locate records of various sizes thereon, means carried by said record holder for directing the needle to the starting groove of a record in said holder, and means for controlling the operation of said graphophone including a member carried by said record holder to be engaged by said sound arm at the finishing groove of said record.

7. A holder for graphophone records comprising a shell or housing provided with a central hollow post adapted to fit the spindle of a graphophone and to center records, a needle guide adjustably mounted on the periphery of said holder, and a contact adjustably mounted on said hollow post.

8. The combination of a sound reproducing machine provided with a sound arm, a record holder therefor provided with a guide adjacent its periphery and a contact adjacent its center, means automatically operated by said machine for moving said sound arm to engage said guide, and means controlled by said sound arm for removing said sound arm from playing position.

9. In a graphophone, a record carrying table, a sound arm movable into and out of position over said table, a record holder provided with a guide for said sound arm, means for moving said sound arm into engagement with said guide, a contact carried by said record holder, and means subject to the control of said sound arm and contact for controlling the operation of the graphophone.

10. In a graphophone, a rotary support or table, record holders adapted to be mounted thereon, each of said holders being provided with a sound arm guide and a contact, means for alternately installing and removing said holders, a sound arm movable into and out of operative relation to said support or table, and means for moving said sound arm to said guide and away from said contact, said holders installing and removing means and said sound arm moving means being under the control of said sound arm and contact.

11. In a graphophone, a rotary support or table, record holders, each provided with a contact, a support for said holders, records in said holders, means for moving said holders from said support to said rotary support or table, means for removing said holders from said rotary support or table, a sound arm movable across said rotary support or table, and means controlled by said sound arm in conjunction with said contact for operating said holders-moving means.

12. In a graphophone, a rotary support or table, record holders each provided with

an adjustable sound-arm guide, and an adjustable contact, a sound arm movable into and out of operating relation to records in said holders, means for moving said records in series onto and off of said support or table, a magnet for controlling the said movement of the sound arm, and an energizing circuit for said magnet including said sound arm and contact.

13. In a graphophone, a rotary support or table, record holders each provided with an adjustable sound-arm guide, and an adjustable contact, a sound arm movable into and out of operating relation to records in said holders, means for moving said records in series onto and off of said support or table, a magnet for controlling the said movement of the sound arm, an energizing circuit for said magnet including said sound arm and contact, and means for raising and lowering said sound arm.

14. In a graphophone, a rotary support or table, record holders each provided with an adjustable sound-arm guide, and an adjustable contact, a sound arm movable into and out of operating relation to records in said holders, means for moving said records in series onto and off of said support or table, a magnet for controlling the said movement of the sound arm, an energizing circuit for said magnet including said sound arm and contact, and means for raising and lowering said sound arm, said raising and lowering means being subject to the control of said magnet.

15. In a graphophone, a record carrying table, a sound arm, record holders each provided with an adjustable sound arm guide, means for moving said sound arm over the record in the record holder and into engagement with the sound arm guide to convey the needle to the initial groove in the record and means for placing the needle in the groove.

16. In a graphophone, a record carrying table, record holders each provided with a sound arm guide and adjustable contact, a sound arm movable into and out of operating relation to the records in said record holders, means for moving the sound arm over the record, means for dropping the sound arm into engagement with the sound arm guide whereby the needle is guided to the initial groove of the record and placed therein, and means operative when the sound arm engages the contact for lifting and moving said sound arm to one side of the record holder.

17. A holder for graphophone records adapted to be placed on the table or movable support of a graphophone, said record holder being provided with an adjustable guide pivotally mounted at the outer edge of said holder, and capable of being adjusted above the record in the holder so that the free end

thereof will be directly over the initial groove of the record.

18. A holder for graphophone records adapted to be placed on the table or movable support of a graphophone, said holder being provided with an adjustable guide pivotally mounted adjacent the periphery thereof and curved in a manner to gradually guide a needle to the initial groove of a record.

19. In a graphophone, a record carrying table, a record holder, means for moving said record holder into and out of playing position on the record carrying table, a sound arm, means for moving said sound arm into and out of playing position, a contact carried by said record holder, and means subject to the control of said sound arm and contact for controlling the operation of the graphophone.

20. In a graphophone, a record-carrying table, a record holder, a sound arm, and means controlled by the record holder for moving the sound arm out of playing position after the playing period.

21. In a graphophone, a rotary record support or table, a plurality of record holders each provided with an adjustable sound arm guide, and an adjustable contact member, a sound arm movable into and out of playing relation to the records in said holders, means for moving said records onto and off of said table, and means for controlling the movement of the sound arm when the sound arm engages the contact member.

22. A holder for graphophone records provided with record centering means, adjustable means for guiding a needle to the initial groove of a record, and adjustable means adjacent the axis of said record holder for arresting the playing action of a needle.

23. A holder for graphophone records adapted to be placed on the table or movable support of a graphophone, said holder being provided with adjustable means for guiding the needle to the initial groove of a record, and an adjustable contact capable of arresting the playing action of the needle at the terminating groove of the record.

24. In a graphophone, a rotary support or table, record holders each provided with an adjustable sound arm guide, an adjustable contact, a sound arm movable into and out of operating relation to records in said holders, means for moving said records onto and off of said support or table, means for controlling the movement of the sound arm and means including the sound arm and contact for raising and lowering said sound arm.

25. In a graphophone, a record carrying table, means for holding records in vertical position, means for placing the records in horizontal position on the table, a sound arm capable of being moved across and to one side of said record, means for remov-

ing the records from horizontal position on the table to vertical position on suitable supports and means for automatically timing said record handling means and sound arm to perform the operations in the manner herein described.

26. In a graphophone, a record carrying table, means for holding records in vertical position, grippers adapted to convey the records to horizontal position on the record carrying table, a sound arm capable of being moved across and to one side of said record, grippers for removing the records from horizontal position on the table to vertical position on suitable supports, and means for automatically timing said record handling means and sound arm to perform the operations in the sequential manner herein described.

27. In a graphophone, a record carrying table, means for rotating the same, means for holding records in vertical position, means for placing the records in horizontal position on the table, a sound arm, means for moving said sound arm into playing position over the record, means for removing the records from horizontal position on the table to vertical position on suitable supports, and means for placing the sound arm without the path of the records and stopping the rotating record table during the removal of the records from the table.

28. In a graphophone, a record carrying

table, means for holding records in vertical position, means for placing the records in horizontal position on the table, a sound arm, means for moving said sound arm into playing position over the record, means for removing the records from horizontal position on the table to vertical position on suitable supports, and means for placing the sound arm without the path of the records during the removal of said records from the table.

29. In a graphophone, a record carrying table, a sound arm, a record holder provided with an adjustable sound arm guide, means for moving said sound arm over the record in the record holder, and means for giving said sound arm a two step lowering movement, first into engagement with the sound arm guide and then into the initial groove of the record.

30. In a graphophone, a record carrying table, a plurality of record holders supported in position adjacent said table, grippers adapted to convey the record holders from their support to the table, means operated by the grippers for advancing the record holders on their support to position to be successively engaged by said grippers, and means controlled by said advancing means for stopping the playing action of the graphophone after the last record has been played.

EDWARD ROGERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

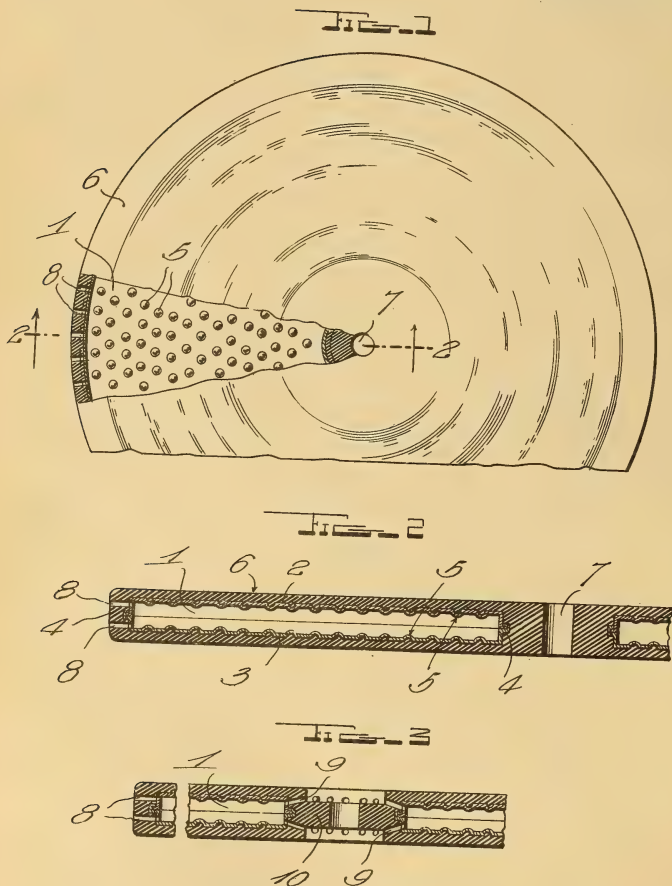
PHONOGRAPH RECORD.

1,243,987 ----- O. C. Schroeder.
Patented Oct. 23, 1917.
Filed Aug. 23, 1917.

O. C. SCHROEDER.
 PHONOGRAPH RECORD.
 APPLICATION FILED AUG. 23, 1917.

1,243,987.

Patented Oct. 23, 1917.



Witness

E. C. Schroeder

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UNITED STATES PATENT OFFICE.

OTTO CARL SCHROEDER, OF DETROIT, MICHIGAN.

PHONOGRAPH-RECORD.

1,243,987.

Specification of Letters Patent.

Patented Oct. 23, 1917.

Application filed August 23, 1917. Serial No. 187,862.

To all whom it may concern:

Be it known that I, OTTO C. SCHROEDER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Phonograph-Records; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to acoustics and more particularly to certain new and useful improvements in phonograph records.

In the common form of phonograph records, little difficulty is experienced in reproducing the voices of comparatively loud singers and the music from comparatively loud instruments, but great difficulty is experienced where the sound to be reproduced is weak. This has been overcome to some extent by using loud toned needles, but the results obtained by using them are not as satisfactory as is desired.

It is the object of this invention to provide a means for greatly magnifying the reproduction of the sound made by a singer having an extremely weak voice or an instrument having an extremely weak tone, and to this end it consists of a specially constructed phonograph record provided with an internal sound box.

Another object of the invention is to provide a device of this character which will be simple, strong, durable and inexpensive in construction, efficient and reliable in operation, and well adapted to the purpose for which it is designed.

With these and numerous other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be hereinafter fully described and claimed.

In the accompanying drawings forming a part of the application, and in which similar reference characters are used to designate like parts throughout the several views:—

Figure 1 is a plan view partly broken away and in section, of one form of phonograph record constructed in accordance with this invention;

Fig. 2 is a transverse sectional view of the record taken on the line 2—2 of Fig. 1; and

Fig. 3 is a similar view of a slightly modified form.

Referring more particularly to the drawings, the numeral 1 represents a hollow sound box which is preferably made from aluminum or other metal annular plates 2 and 3 arranged in coincident and spaced relation and having their inner and outer edges bent toward each other and crimped or otherwise connected together as at 4. Although it is not absolutely essential, yet it is preferable to provide each of the plates 2 and 3 with a plurality of indentations or other roughened portions 5 on their outer sides.

Molded around the sound box 1 in any suitable manner is a coating 6 of the usual composition of which records are made. This coating 6 when applied to the sound box gives the record the same appearance as the common form of records have, it being provided with the usual central opening 7 through which the spindle of the rotary table of the phonograph extends. One or both sides of the coating 6 may be provided with a spiral groove provided with the usual undulations which, in connection with the reproducer, produce the sound.

In Figs. 1 and 2 of the drawing the coating 6 is shown as being preferably flat on both of its sides, it being of greater thickness at its central portion than at other places. Around the outer edge of the record are formed a plurality of apertures 8 which lead into the sound box 1 from the exterior of the record.

In Fig. 3 of the drawings the record is shown as being provided with the apertures 8 around its outer edge, but is also shown as being provided with apertures 9 which lead from the exterior of the record to the sound box 1 through the inner edge of the same, the coating 6 being in this case reduced in thickness as at 10 at its central portion to form in effect a web.

By having the sound box disposed within the interior of the record, the sound produced by the same will be greatly magnified, and hence the voice of a weak singer or the music from a weak instrument may be reproduced so as to obtain all the qualities of the sound.

It is obvious that numerous changes in form, proportion and in the minor details of construction may be resorted to without

departing from the spirit of this invention and hence I do not wish to be limited to the precise construction herein shown and described.

5 I claim:

1. A loud tone phonographic record having a space in the interior thereof which acts in the capacity of a sound box.

10 2. A loud tone phonographic record having a hollow metallic sound box disposed within the interior thereof.

3. A loud tone phonographic record having a hollow sound box disposed within the interior thereof, said sound box being composed of a pair of spaced metallic plates having their edges curved toward each other and crimped together.

15 4. A loud tone phonographic record having a hollow metallic sound box disposed within the interior thereof and being provided with a plurality of apertures at its outer edge leading into said sound box.

20 5. A loud tone phonographic record hav-

ing a hollow sound box disposed within the interior thereof, said sound box being composed of a pair of spaced metallic annular plates having their inner and outer edges secured together and said record having a plurality of apertures at its inner and outer edges, said apertures leading into said sound box. 25 30

6. A loud tone phonographic record comprising a hollow metallic sound box having indentations on its opposite sides, and a composition coating molded around said sound box, said coating filling the indentations in said sound box for anchoring the former to the latter. 35

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 40

OTTO CARL SCHROEDER.

Witnesses:

THEOW KOLBE,

H. B. VAN SLEMBROUCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

GRAPHOPHONE ATTACHMENT.

1,244,170 ----- J. I. Buffa,
Patented Oct. 23, 1917.
Filed May 7, 1917.

J. I. BUFFA.
 GRAPHOPHONE ATTACHMENT.
 APPLICATION FILED MAY 7, 1917.

1,244,170.

Patented Oct. 23, 1917.

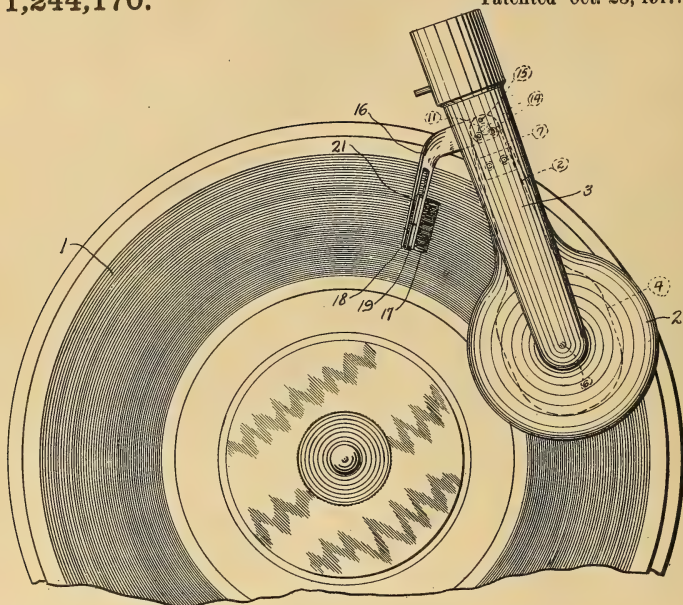


Fig. 1.

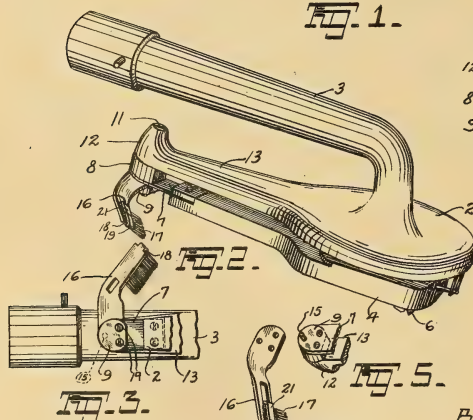


Fig. 2.

Fig. 3.



Fig. 4.

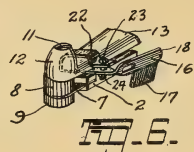


Fig. 5.

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UNITED STATES PATENT OFFICE.

JAMES I. BUFFA, OF SAN FRANCISCO, CALIFORNIA.

GRAPHOPHONE ATTACHMENT.

1,244,170.

Specification of Letters Patent.

Patented Oct. 23, 1917.

Application filed May 7, 1917. Serial No. 166,844.

To all whom it may concern:

Be it known that I, JAMES I. BUFFA, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Graphophone Attachments, of which the following is a specification.

The present invention relates to improvements in talking machines, and especially in Edison disk phonographs.

The object of the invention is to provide means, automatically operating with the movement of the reproducer, to remove the dust from the record in front of the reproducer.

In the accompanying drawing, Figure 1 is a broken plan view of an Edison phonograph disk, the reproducer thereon and my improvement attached thereto; Fig. 2 is a perspective view of said reproducer and attachment; Fig. 3 is a broken bottom plan view thereof; Fig. 4 is a perspective view of the attachment detached; Fig. 5 is a broken perspective view of the reproducer arm; Fig. 6 is a broken perspective view showing a modification.

Referring to the drawing, 1 indicates a record, 2 the reproducer, and 3 the sound-conducting tube of an Edison disk phonograph, 4 indicates the weight, carrying at one end the diamond point 6, and connected at the other end with one end of a spring metal strip 7. The other end of said spring strip is secured to a rotary member 8 and a block 9. The rotary member 8 is rotatable about a shaft 11, secured in a boss or enlargement 12 formed at the smaller end of a tapering arm 13 of the reproducer 2. The block 9 is secured on the lower side of said spring strip 7 by means of screws 14 extending through holes in said block and screwed into said rotary member, in which is also secured a fixed pin 15, which is received in a socket in the block 9. 16 indicates a brush holder and 17 a brush held thereby, said brush holder being formed of a strip of metal of which one end 18 is reduced in diameter and bent back on itself, as shown at 19, to form a clamp for clamping one half of the brush, while a tongue 21 is cut out of the metal and bent back upon

itself toward said reduced end to form a clamp for clamping the other half of the brush.

Said holder is so bent so that the portion holding the brush extends at an angle of about 40° with the vertical and also extends in a plane making about 40° with the reproducer arm 13, while the other end of the holder is held horizontally between the block 9 and the spring metal strip 7.

A brush so held will be in the proper position to brush the dust out of the grooves in the record at points in advance of the reproducing point 6.

In the form of the invention shown in Fig. 6 the brush holder is extended to form a band 22 fitting closely around the small end of the reproducer arm 13 close to the boss 12 on said arm, the terminal portion of said holder, after passing around said arm, being firmly secured by a screw 23 and nut 24 to a mediate portion of said holder between the arm and the brush.

As the Edison disk phonograph records have grooves which are considerably shallower than those of other records, it is very important that these grooves be kept free of dust, which impairs the tone of the phonograph.

In the use of my invention this is done automatically and without necessitating any alteration in the construction of the phonograph.

I claim:—

1. In combination with the arm of a reproducer of an Edison phonograph, a pivot secured in an end of said arm, a spring metal strip for carrying the weight, and a block secured to said strip and arm, of a brush holder, and a brush secured in one end thereof, the other end being secured between said strip and block.

2. In combination with the arm of a reproducer of an Edison phonograph, a pivot secured at an end of said arm, a spring metal strip for carrying the weight and a block, and screws securing said block to said strip and arm, of a brush holder and a brush secured in one end thereof, said screws also securing the other end between said strip and block.

J. I. BUFFA.

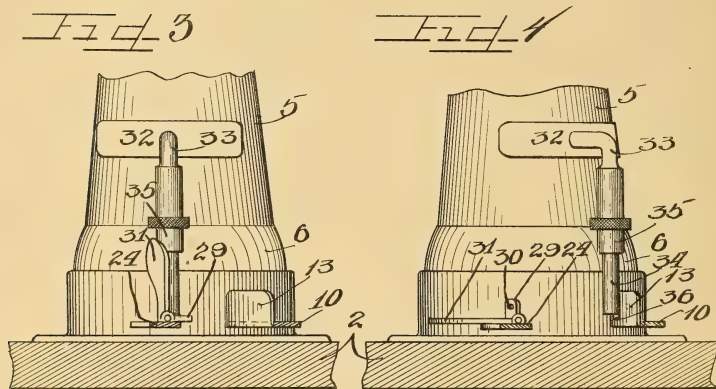
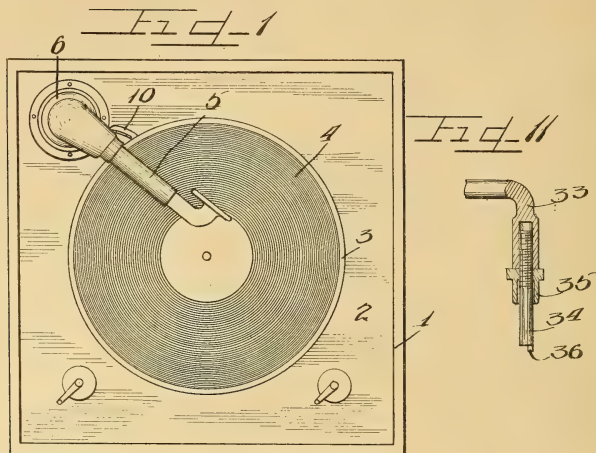
AUTOMATIC STOP FOR TALKING MACHINES.

1,244,550 ----- M. B. Selter.
Patented Oct. 30, 1917.
Filed Oct. 9, 1916.

M. B. SELTER.
 AUTOMATIC STOP FOR TALKING MACHINES.
 APPLICATION FILED OCT. 9, 1916.

1,244,550.

Patented Oct. 30, 1917.
 2 SHEETS—SHEET 1.



Witnesses
J. W. Angell
Charles F. Selig

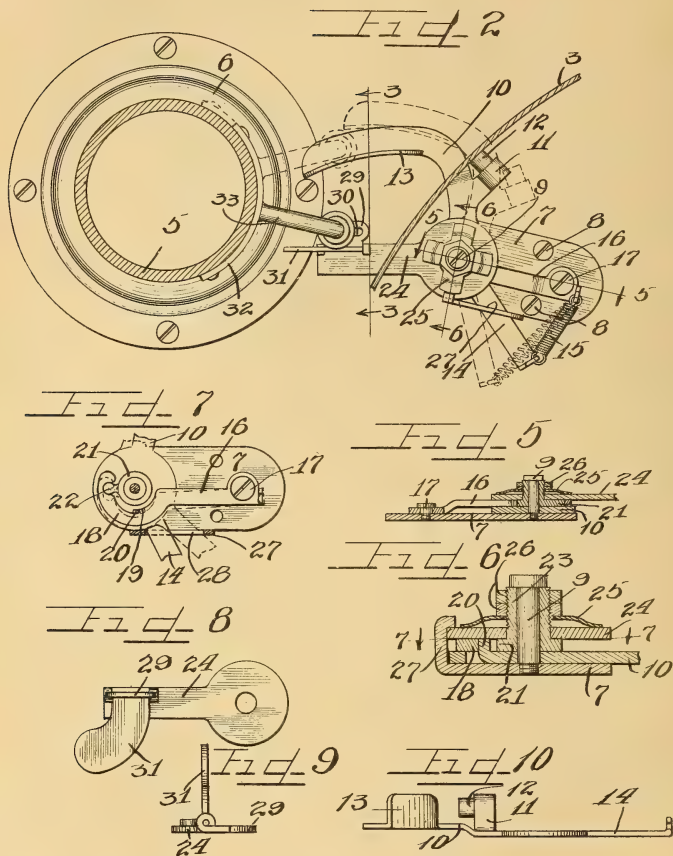
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AUTOMATIC STOP FOR TALKING MACHINES.
APPLICATION FILED OCT. 9, 1916.

1,244,550.

Patented Oct. 30, 1917.

2 SHEETS—SHEET 2.



WITNESSES

J. W. Angell
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INVENTOR

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UNITED STATES PATENT OFFICE.

MILO B. SELTER, OF COLOMA, MICHIGAN, ASSIGNOR TO PLAYERPHONE TALKING MACHINE COMPANY, A CORPORATION OF ILLINOIS.

AUTOMATIC STOP FOR TALKING-MACHINES.

1,244,550.

Specification of Letters Patent.

Patented Oct. 30, 1917.

Application filed October 9, 1916. Serial No. 124,704.

To all whom it may concern:

Be it known that I, MILO B. SELTER, a citizen of the United States, and a resident of the city of Coloma, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in Automatic Stops for Talking-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numericals of reference marked thereon, which form a part of this specification.

This invention relates to an automatic stop mechanism for attachment upon talking or record playing machines operating to apply a brake to the record carrying disk of the machine after completion of the playing of a record, to hold the carrying disk against the movement imparted thereto by the spring motor generally provided as an operating means.

The device embodies a number of novel features, particularly one whereby the stop mechanism may be quickly set to proper position according to the size of the record to be played to insure stopping of the record carrying disk at the completion of the playing of the record carried thereon.

It is an object therefore of this invention to construct a stop mechanism for attachment upon a record playing machine adapted to stop the driving mechanisms of the machine at the completion of the playing of a record carried thereon.

It is also an object of this invention to construct a stop mechanism for use upon record playing machines provided with a braking device releasable at the completion of the playing of a record irrespective of the size of the record played to bring the driving mechanisms to rest.

It is also an object of this invention to construct an automatic stop mechanism for attachment upon a record playing machine which utilizes the movement of the recorder arm of the machine to operate the stop mechanism, said mechanism being provided with means for positively setting the stop mechanism at the proper position for operation for different sizes of records played, by first utilizing a trial swing of the recorder arm for the purpose after a record

has been placed in position upon the machine.

It is also an object of this invention to construct an automatically operating mechanism wherein a brake arm is normally held in release position by locking mechanism which is released as the recorder arm of the machine moves inwardly into extreme position at the completion of the playing of the record on the machine, so that release of the brake arm serves to apply the brake to the driving carrying means for the record on the machine at the completion of the playing thereof.

It is furthermore an important object of this invention to construct an automatic stop mechanism for attachment on playing machines wherein a brake arm is normally held in retracted position and is capable of release by a movement of a release bar which may be set in any adjusted position according to the size of the record to be played to insure actuation of the release bar by the recorder arm of the machine as the same moves into the extreme playing position on a record to bring the operating or driving means for said record to rest after the playing thereof.

It is finally an object of this invention to construct an automatically operating stop mechanism for attachment upon a record playing machine which utilizes the movement of the recorder arm of the machine, and actuates release mechanisms whereby a brake is applied to the driving means by which the record played is caused to rotate to bring the same to rest after the completion of playing thereof.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1, is a top plan view of a playing machine equipped with a device embodying the principles of my invention.

Fig. 2, is a horizontal sectional detail taken through the base of the recorder arm and the record carrying disk illustrating in plan view the mechanisms embodying the principles of my invention.

Fig. 3, is a detail section taken on line 3-3, of Fig. 2, with parts shown in elevation.

Fig. 4, is a similar detail view illustrating the recorder arm in another position of adjustment.

Fig. 5, is a detail section taken on line 5—5, of Fig. 2, with parts omitted.

Fig. 6, is a detail section taken on line 6—6, of Fig. 2.

Fig. 7, is a detail view taken on line 7—7, of Fig. 6.

Fig. 8, is a plan view of the release lever and its counterweighted slotted plate detached from the mechanism.

Fig. 9, is an edge view with the counterweight thrown upwardly into vertical position.

Fig. 10, is an edge view of the brake arm detached from the mechanism.

As shown in the drawings: The casing of the playing machine is denoted as a whole by the reference numeral 1, and is provided with a floor or horizontal partition 2, therein, rotatable above which and driven in any suitable manner is a horizontal flat record carrying disk on which a record is supported and rotated therewith, when played. A record 4, is shown supported upon a carrying disk 3, in Fig. 1, and mounted at one corner on the partition wall or floor 2, is a universally movable recorder arm 5, having a ball and socket connection 6, at the point of support upon a partition wall or floor 2, as clearly shown in the enlarged view of Fig. 4. Secured upon the top surface of the partition wall or floor 2, at a point beneath the record carrying disk and near the periphery thereof as shown in Fig. 2, is a stationary plate 7, held securely in position by means of screws 8. Secured near one end of said plate 7, is a stud or pivot 9, and pivoted thereon and contacting the top surface of the stationary plate 7, is a brake arm 10, having a short extension 11, which has a fiber or insert of other material 12, adapted to contact with the inner peripheral surface of the downwardly turned flange of the carrying disk 3, as shown in Fig. 2. One edge of said brake arm 10, is flanged upwardly as denoted by the reference numeral 13, to afford a finger grip whereby the brake arm may be thrust into release position. Formed integral with said brake arm 10, and extending on the opposite side of the pivot 9, is a tail lever extension 14, having connected to the outer end thereof a spiral spring 15, which is in turn connected to the flanged end of a latch lever 16, pivoted on a stud 17, secured in said stationary plate 7, at the end opposite from the stud 9. Said lever 16, is bent upwardly away from the stationary plate 7, as clearly shown in Fig. 5, and formed on the end thereof is a curved arm portion 18, as clearly shown in Fig. 7, which is provided with a recess on its inner curved edge affording a shoulder 19, adapted to receive in latching engagement therewith,

a lug 20, projecting upwardly from the middle portion of the brake arm 10, clearly shown in Fig. 6. Pivotaly mounted upon the stud 9, is a ring or collar 21, which lies flat against the top surface of the circular portion of the brake arm 10, and is provided with rounded projection 22, which is at all times engaged in a rounded complemental recess provided therefor in the outer curved end 18, of the lever 16, as clearly shown in Fig. 7. Said collar or ring member 21, is provided with an upstanding tubular hub portion 23, which extends upwardly beneath the head of the pivot 9, and secured thereon flat above said ring or collar 21, is a flat circular head of a release lever or arm 24, so that said release lever 24, and said ring member 21, are constrained to pivot in fixed relation as a unit upon the pivot 9.

In order to hold the parts in assembled relation, a four-fingered spring element 25, is engaged over the hub extension 23, bearing downwardly upon the top surface of the flat circular head of the release lever 24, and is held thrust downwardly by a pair of nuts 26, threaded on the upper end of the hub extension 23. One edge of said stationary plate 7, is flanged upwardly as denoted by the reference numeral 27, and is slightly bent over the rounded head of the release lever 24, as clearly shown in Figs. 2 and 6, and said flanged portion 27, is provided with a slot 28 through which the tail lever 14, extends so as to be limited in its movement thereby. Said release lever or arm 24, has pivoted on the outer end thereof as clearly shown in Figs. 2 and 8, a slotted plate 29, having a slot 30, therein, said plate being normally held in upright position by a counterweight 31, formed integral with said plate, and also serving as a finger grip and mounted so that the plate 29, may be forced downwardly into the horizontal position shown.

A curved bracket member 32, is secured upon the exterior surface of the vertical portion of the recorder arm 5, as clearly shown in Figs. 2, 3 and 4, and secured therein is an outwardly downwardly directed arm 33, the lower end of which is recessed and internally threaded to receive engaged therein a pin 34, shown in detail in Fig. 11, and held securely in adjusted position in said arm by a lock nut 35, also threaded on said pin. A projection 36, is formed on the lower end of the pin 34, for coaction with the slot 30, in the pivoted stop brake 29, at the end of the release lever 24.

The operation is as follows:

Referring to Fig. 1, in playing the record 4, the recording or reproducing arm of the talking machine swings inwardly from the outer periphery of the record toward the center thereof and it is then desirable to bring the driving mechanisms for the record

to rest at the time that the recorder arm reaches its extreme inner position of movement for the particular record played. This movement of the recording or reproducing arm is utilized to operate the stop mechanism but the mechanism must first be set to cause stoppage of the driving mechanism for the record played according to the size of the record as the distance traveled by the reproducing or recording arm 5, is different for different sizes of records.

After the record is placed upon the machine, the brake arm 10, is swung outwardly either by the fingers or merely by the swinging of the recording arm 5, outwardly toward the initial position for playing whereby the projection 20, on said brake arm 10, will lock behind the shoulder 19, (shown in Fig. 7,) of the curved lever 16—18, thus holding said brake arm outwardly with the brake insert 12, out of contact with the flanged periphery of the disk 3, which carries the record. A trial swing of the recorder arm 5, is then made inwardly to the extreme inner position which the same will assume upon the completion of the playing of the record, but prior to such inward swinging movement of the recorder arm the counter-weight 31, on the release lever 24, is swung upwardly into the position shown in Fig. 3. Thus the projection 36, on the lower end of the pin which is attached to and moves with the recorder arm, engages in the slot 30, of the stop plate 29, so that the release arm 24, is caused to swing to one side as said trial inward swing of the recorder arm 5, is made. The recorder arm 5, is then elevated by movement of its ball and socket connection to withdraw the projection 36, from the slot 30, of the stop plate 29, whereupon the counterweight 31, swings downwardly, as shown in Fig. 4, and the recorder arm is then swung to the outer periphery of the record 4, to be played, so that the pin member 34, attached thereon, is in the position shown in Fig. 4.

When the record is played, the recorder arm is started at the outer periphery of the record 4, and travels inwardly toward the center of the record, and at the completion of the playing of the record, the pin member 34, attached on said recorder arm, strikes against the upstanding stop plate 30, thereby swinging the release lever 24, slightly to one side, and, owing to the fact that said release lever is connected upon the tubular hub extension 23, of the ring 21, the projection 22, on said ring, serves to swing the curved lever 16—18, outwardly, so that the shoulder 19, on said curved lever, is moved from behind the lug 20. This release of the lug 20, causes the stressed spring 15, to draw the tail lever extension 14, of the brake arm 10, suddenly inwardly, so that the brake arm 10, is swung from the dotted line posi-

tion shown in Fig. 2, to the full line position, and the brake insert 12, is pressed firmly upon the inner surface of the flange of the record carrying disk to bring said disk and its driving mechanisms to rest. The inward pull of the spring 15, upon the tail lever 14, has no effect upon the adjustment of the release lever mechanism for the reason that the stress of said spring is transmitted through the lug 20, and shoulder 19, of the curved arm 16—18, substantially in line with the pivot center 17, thereof, and the friction of the parts due to the four fingered spring member 25, will serve to hold said release lever 24, in any of its adjusted positions for proper release of the lug 20, whereby the brake may be applied to the driving mechanism carrying the playing record 4.

I am aware that various details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. In a stop mechanism of the class described the combination with a recording arm and record carrying disk of a talking machine, of a brake arm pivoted adjacent the record carrying disk adapted to be impelled into contact therewith to stop the same from movement, means normally impelling said brake arm toward braking position, a stop lever, a slotted counterweight plate pivoted thereon, means secured to the recording arm to engage in said slotted plate when adjusting the stop mechanism and means operated by the stop lever for releasing the brake arm.

2. In a stop mechanism for talking machines the combination with a record carrying disk and recorder arm, of a brake arm normally impelled into braking position against the record carrying disk, mechanism operating to maintain said brake arm in position out of use, means adjusting said mechanism into different positions for withholding said brake arm in position out of use according to the size of the record played, comprising an arm and adjustable pin carried on the recorder arm and a pivoted slotted plate to receive the pin, and means associated with the recorder arm to actuate said mechanism to release the brake arm and stop the record carrying disk from movement at the completion of the playing of a record.

3. A stop mechanism for talking machines embracing a brake arm having an integral tail provided with a tooth, a latch member provided with a plurality of notches, a spring connecting said tail and latch member normally holding said tooth in one of said notches, a stop lever, and a collar fric-

tionally movable therewith having a rounded head integral therewith engaging in one of the notches in said latch adapted when actuated to shift said latch to release the tooth from its notch permitting the spring to operate the brake.

4. A stop mechanism for talking machines embracing a brake arm having an integral tail provided with a tooth, a latch member provided with a plurality of notches, a spring connecting said tail and latch member normally holding said tooth in one of said notches, a stop lever, a collar frictionally movable therewith having a rounded head integral therewith engaging in one of the notches in said latch adapted when actuated to shift said latch to release the tooth from its notch permitting the spring to operate the brake, a counterweighted slotted plate pivoted to the stop lever, and an adjustable member carried by the recorder arm for engaging in the slot and setting

the mechanism to release the brake at any predetermined position.

5. A stop mechanism for talking machines embracing a brake lever, a latch lever for holding the brake lever out of braking position, means for setting the brake when the latch lever is released, a stop lever, a projection secured to the recorder arm and an adjustable member secured to the stop lever adapted in one adjustment to engage said projection to set the mechanism to release the brake at a predetermined position and in another adjustment to engage the projection to actuate the stop lever to release the brake mechanism.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

MILO B. SELTER.

Witnesses:

CHARLES W. HILLS, Jr.,
EARL M. HARDINE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC STOP MECHANISM FOR PHONOGRAPH MACHINES.

1,244,551 -----M. B. Selter.

Patented Oct. 30, 1917.

Filed Oct. 9, 1916.

M. B. SELTER.
 AUTOMATIC STOP MECHANISM FOR PHONOGRAPH MACHINES.
 APPLICATION FILED OCT. 9, 1916.

1,244,551.

Patented Oct. 30, 1917.

2 SHEETS—SHEET 1.

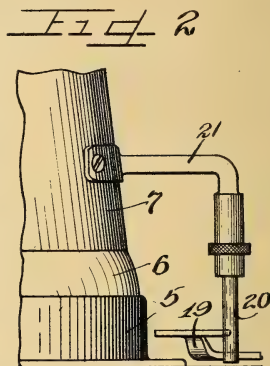
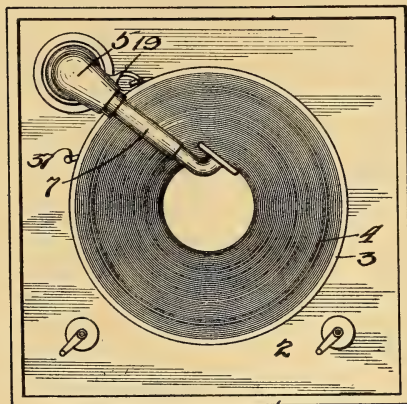


Fig 3

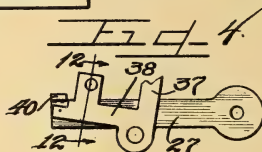
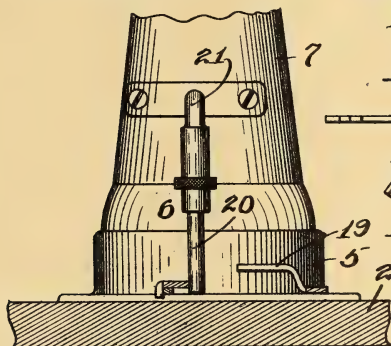
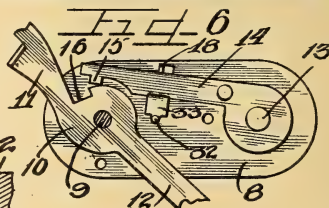
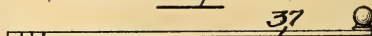


Fig 5



WITNESSES

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 AUTOMATIC STOP MECHANISM FOR PHONOGRAPH MACHINES.
 APPLICATION FILED OCT. 9, 1916.

1,244,551.

Patented Oct. 30, 1917.

2 SHEETS—SHEET 2.

Fig. 7

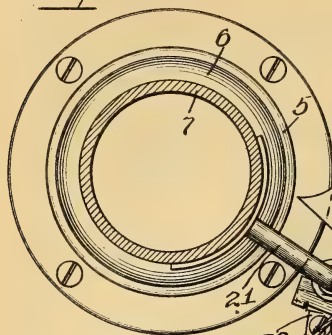


Fig. 9

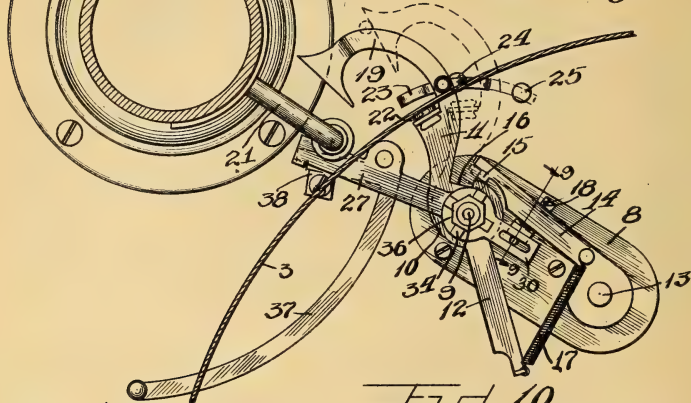
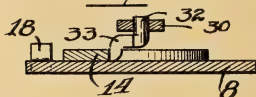


Fig. 8

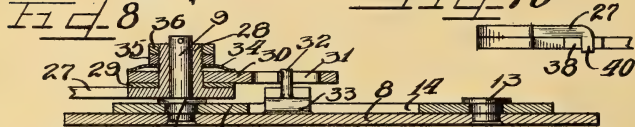


Fig. 10

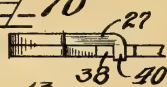


Fig. 13

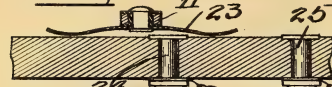
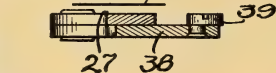


Fig. 12



Witnesses

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UNITED STATES PATENT OFFICE.

MILO B. SELTER, OF COLOMA, MICHIGAN, ASSIGNOR TO PLAYERPHONE TALKING MACHINE COMPANY, A CORPORATION OF ILLINOIS.

AUTOMATIC STOP MECHANISM FOR PHONOGRAPH-MACHINES.

1,244,551.

Specification of Letters Patent.

Patented Oct. 30, 1917.

Application filed October 9, 1916. Serial No. 124,705.

To all whom it may concern:

Be it known that I, MILO B. SELTER, a citizen of the United States, and a resident of the city of Coloma, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in Automatic Stop Mechanism for Phonograph-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to an improved form of automatic stop mechanisms for association with a phonograph or talking machine whereon disk records are played, said mechanisms adapted to operate at the completion of the playing of the record by the machine to positively bring the record carrying disk or table to rest and also in the case of electrically driven machines, to break the electric circuit to the driving motor.

It is an object therefore of this invention to construct an automatic stop mechanism for talking machines adapted to be set in operating position according to the size of the disk record to be played so that at the completion of the playing of the record, the carrying or driving means for the record is immediately brought to rest.

It is also an object of this invention to construct an automatically operating mechanism for phonograph or talking machines adapted when the recorder arm is swung to playing position to set the driving means of the machine in operation and acting automatically when the recorder arm is swung to its opposite extreme of movement at the completion of playing of the record, to bring said driving mechanism to rest.

It is also an important object of this invention to construct an automatic stop mechanism for talking machines operated by movement of the recorder arm of the machine, movement thereof to initial playing position serving to release the driving mechanisms and close the electric circuit thereto and movement of said arm toward the other extreme position after travel across the record serving to release a brake mechanism and further cutting off the electric circuit to the driving means so that the

record played is brought immediately to rest after completion of playing thereof.

It is furthermore an important object of this invention to construct an automatically operating stop mechanism for talking machines comprising means actuable, by movement of the recorder arm to initial playing position to release the driving means and close the electric circuit thereto to set said driving means in operation and operating by movement across the record into an opposite extreme position determined by an adjusting device set according to the size of the record to be played to release the brake means and also releasing the switch mechanism from movement into open position so that the record is brought to rest at the completion of the playing thereof.

It is finally an object of this invention to construct a simple type of automatic stop mechanism for talking machines operating to set the driving means of the machine in operation when the recorder arm is moved toward initial playing position, and to disconnect the drive of the machine after the completion of the playing of the record thereon.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a top plan view of a talking machine equipped with mechanisms embodying the principles of my invention.

Fig. 2 is a fragmentary side view of the lower end of the recorder arm, showing a part of the mechanisms of the device.

Fig. 3 is a fragmentary front face view of the lower end of the recorder arm, showing a part of the mechanisms of the device.

Fig. 4 is a fragmentary bottom plan view of the stop lever and its pivotal contact arm.

Fig. 5 is an edge view of the manually actuable lever of the contact arm shown in Fig. 4.

Fig. 6 is a fragmentary top plan view of a portion of the release mechanism with parts omitted.

Fig. 7 is a detail top plan view with parts in section and parts omitted of the mechanisms embodying the principles of my invention, and illustrating the operation in dotted lines.

Fig. 8 is a central vertical section with parts omitted and parts in elevation, taken through the mechanism shown in Fig. 7.

Fig. 9 is a detail section taken on line 5-9 of Fig. 7.

Fig. 10 is a detail view at one end of the lever shown in Fig. 4.

Fig. 11 is an edge view of the switch contact arm and brake thereon.

Fig. 12 is a detail section taken on line 12-12 of Fig. 4.

Fig. 13 is a sectional detail illustrating the switch mechanism of the device.

As shown on the drawings:

15 The reference numeral 1, indicates the casing of a talking machine which is provided with a horizontal top plate or partition 2, above which is shown a horizontally rotatable record carrying disk 3, upon which
20 a record 4, to be played, is placed. Secured over an aperture in the top plate 2, is an annular member or ring 5, which is spherically concave on its interior affording a socket for the ball end 6, of the record arm
25 7, thus permitting universal movement thereof within certain limits. Mounted beneath the record carrying table or disk 3, as shown in Fig. 7, is a stationary base plate 8, and secured through the forward end
30 thereof is a pintle 9, on which the circular portion 10, of a brake and switch lever 11, is pivoted, with a tail extension 12, of said lever extending outwardly on one side of the stationary plate 8.

35 Pivoted upon a stud 13, mounted in the rear end of the base plate 8, is a forwardly extending lock lever 14, provided with a tooth 15, at the forward end thereof adapted to engage in a recess 16, provided in the
40 rounded portion 10, of said brake and switch lever, and connected upon said lock lever 14, is a tension spring 17, which is also connected to the tail lever extension 12, of the brake arm. A lug 18, is struck upwardly
45 from the base plate 8, and serves to limit the outward movement of the lock lever 14. The outer end of said brake arm or lever 11, is curved and bent upwardly as denoted by the reference numeral 19, and so disposed
50 as to be readily contacted by a vertically depending pin 20, secured adjustably in a bracket extension 21, mounted on the front rounded portion of the recorder arm 7. A portion of said brake arm or lever
55 11, near the middle thereof, is struck upwardly and secured thereto is a friction brake insert 22, of any suitable material, disposed to contact against the inner surface of the depending flange portion of the
60 disk carrying table 3, as shown in Fig. 7. Also secured to the middle portion of the brake arm or lever 11, on the under surface thereof, is a resilient switch closure element 23, shown in detail in Fig. 13, adapted in
65 one position of said brake arm to establish

a closed circuit through terminal contact members 24 and 25, respectively, secured in the top plate 2, of the machine casing. Journaled upon the stud 9, above a collar or flange 26, formed thereon, is a lever 27,
70 having an elongated hub extension 28, which extends upwardly around the pintle 9, as clearly shown in Fig. 8. Mounted above the lever 27, upon the hub 28, thereof, is a washer 29, and engaged over the hub 28, and above
75 said washer, is a lever 30, provided with a slot 31, which is engaged by a pin 32, formed on an extension 33, of the lever 14. Also mounted upon the hub 28, is a spring element 34, affording a plurality of resilient
80 fingers bearing upon said lever 30, and secured upon the upper threaded end of the hub 28, are two lock nuts 35 and 36, respectively, which are tightened down upon said resilient member and thus hold the lever
85 30, the washer 29, and the lever 27, in frictional relation with one another.

Pivoted beneath the outer end of the lever 27, is a long curved handle or lever 37,
90 shown in Fig. 7, having a short arm extension 38, integral therewith, shown in detail in Figs. 4 and 12, on an extension of which is adjustably mounted and movable against friction, an eccentric stop 39, to
95 limit movement of the arm 38, in one direction and a down-turned lug 40, is provided on the extreme end of the lever 27, to limit the movement of said arm in an opposite direction.

The operation is as follows:

After a record has been placed upon a machine, the recorder arm 7, is placed into the position shown in Fig. 1, that is, the position which the arm will assume at the
105 completion of the playing of the record. Then the lever 37, is swung toward the pin 20, on the recorder arm until the short pivoted arm 38, of said lever 37, strikes against the pin 20, and this position of the lever
110 27, which has rotated about its pivot 9, with movement of the lever 37, is the "stop" position for the record to be played.

The recorder arm is then swung counter-clockwise into initial playing position, the pin 20, thereby striking the curved contact
115 lever 11-19, and swinging the same about the pivot 9, in a clockwise direction against the stress of the tension spring 17, sufficiently such that the recess 16, in said lever, shown in Fig. 6, rotates to a position to be
120 engaged by the tooth 15, of the lock lever 14, which thus operates to hold said lever 11-19, in the dotted line position shown in Fig. 2. Movement of the lever 11-19, into this position, serves to close the circuit between the switch contact terminals 24 and
125 25, by means of the switch element 23, so that the electric drive for the carrying disk 3, is set into operation. As the recorder arm travels across the record 4, during playing
130

thereof, the pin extension 20, on said recorder arm approaches the lever 27, finally striking the same, whereby said lever is rotated and due to frictional engagement with the lever 30, rotates said lever 30, which in turn, acts, due to the pin and slot engagement with the lever 14, to shift said lock lever 14, outwardly thereby releasing the tooth 15, from engagement with the recess. This allows the lever 11, to be retracted by its spring 17, thereby breaking the electric circuit and applying the small friction brake shoe 22, against the inner periphery of the depending flange of the carrying table 3.

It is to be noted that in adjusting the stop lever 27, into position by movement of the long curved handle 37, contact with the depending pin 20, of the recorder arm, is had by means of the small short arm extension 38, of the lever 37, which is limited in its pivotal movement on said lever 27, by the eccentric stop 39, but upon return movement of the pin 20, with the recorder arm during the playing of the record, said pin 20, strikes against the edge of the lever 27, and not against the short arm 38. It is evident therefore that a further travel of the recorder arm and its pin 20, is necessary at the completion of the playing of the record to strike the arm 27, to release the stop mechanism, than that required to obtain the position, in which the recorder arm was placed when the lever 27, was moved by the lever 37, into "stop" position for that particular record. This additional amount of movement or overtravel of the recorder arm which is required at the completion of the playing of the record insures a complete movement thereof over the record so that the stop mechanism will not accidentally be released prior to a complete playing of the record. The relative movement between the short arm 32, and the lever 27, which provides for this overplay is determined by the adjustment of the friction eccentric stop 39, which contacts with the rear edge of lever 27, in the pivotal movement of the arm 37.

I am aware that various details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A stop mechanism for talking machines comprising a stationary plate, a lever pivoted thereon having a recess formed therein, a latch lever, a tooth thereon adapted for engagement with said recess, a spring connected both to said first mentioned lever and to said latch lever operating to move said latch lever with the tooth thereon into engagement with said recess, a trip lever adapted for contact by the recorder arm of the talking machine, a slotted lever held in fric-

tional engagement with the trip lever, and means secured to the latch lever engaging in said slot adapted to release said latch lever and permit movement of said first mentioned lever under the stress of said spring out of engagement with said latch lever.

2. A stop mechanism for talking machines comprising a stationary plate, a brake arm pivoted thereon having a recess therein, a latch lever pivoted on said stationary plate, a tooth formed thereon for engagement with said recess to hold said brake arm retracted, a spring connected between said latch lever and brake arm to hold the same in locking engagement, a stop lever adapted for contact by the recorder arm of the talking machine, means operated thereby to actuate said latch lever into release position to release said brake arm and permit movement thereof to apply a brake upon the talking machine under the stress of the spring connected thereto, and a mechanism pivoted to said means to permit a slight overtravel of the recorder arm before actuating the latch lever.

3. In a device of the class described, a brake arm, a latch lever adapted for engagement therewith, a spring connected to said latch lever and to said brake arm, a stop lever, a lever pivoted to the stop lever adapted to permit a slight overtravel of the recorder arm in one direction, a lever frictionally connected thereto and connected to said latch lever to release the same whereby said brake arm is released from movement by the stress of its spring and a friction brake means mounted in said brake arm.

4. A stop mechanism for talking machines utilizing the movement of the recorder thereof, comprising a brake arm adapted to be shifted into release position by movement of the recorder arm to initial playing position, a latch lever to hold said brake arm in released position, a stop lever adapted for movement by said recorder arm upon its movement into position at the completion of the playing of the record, means operated by said stop lever to release said latch lever to release said brake arm and permit application thereof to the driving means of the machine to bring the same to rest, a lever pivoted on the latch lever, and means thereon adapted to permit a slight additional movement of the stop lever before releasing the latch lever.

5. A stop mechanism for phonographs comprising a brake lever, a latch lever, a stop lever, a spring connecting the latch and brake levers, a lever pivoted to the stop lever, an eccentric secured thereto, and co-acting stops secured to the stop lever and lever pivoted thereon.

6. A stop mechanism for electrically driven talking machines comprising a sta-

tionary plate, a lever pivoted thereon having a recess formed therein, a switch element in said lever, a latch lever, a tooth thereon adapted for engagement with said recess, a spring connected both to said first mentioned lever and to said latch lever operating to move said latch lever with the tooth thereon into engagement with said recess, means adapted for contact by the recorder arm of the talking machine to release said latch lever, and permit movement of said first mentioned lever under the stress of said spring out of engagement with said latch lever, and switch terminals normally closed by said switch element adapted to be opened by movement of said switch element with said first mentioned lever.

7. A stop mechanism for electrically driven talking machines comprising a stationary plate, a brake arm pivoted thereon having a recess therein, a switch closure on said arm, a latch lever pivoted on said stationary plate, a tooth formed thereon for engagement with said recess to hold said brake arm retracted, a spring connected between said latch lever and brake arm to hold the same in locking engagement, a stop lever adapted for contact by the recorder arm of the talking machine, means operated thereby to actuate said latch lever into release position to release said brake arm to apply a brake upon a talking machine and break the electric circuit to the machine.

8. The combination with an electrically

driven phonograph machine, a brake arm, a latch lever adapted for engagement therewith, a spring connected to said latch lever and to said brake arm, a stop lever, a lever frictionally connected thereto and connected to said latch lever to release the same whereby said brake arm is released from movement by the stress of its spring, a friction brake means mounted in said brake arm, and an electric switch connected on said arm and operated to open circuit position as the arm is released.

9. A stop mechanism for electrically driven talking machines utilizing the movement of the recorder thereof, comprising a unitary brake and switch arm adapted to be shifted into release position by movement of the recorder arm to initial playing position, a latch lever to hold said brake arm in released position, a stop lever adapted for movement by said recorder arm upon its movement into position at the completion of the playing of the record, and means operated by said stop lever to release said latch lever to release said brake arm to break the electric circuit and brake the driving means of the machine to bring the same to rest.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

MILO B. SELTER.

Witnesses:

CHARLES W. HILLS, Jr.,
EARL M. HARDINE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH

1,244,588 ----- L. Cole.
Patented Oct. 30, 1917,
Filed Sept. 1, 1916.

1,244,588.

2 SHEETS--SHEET 1.

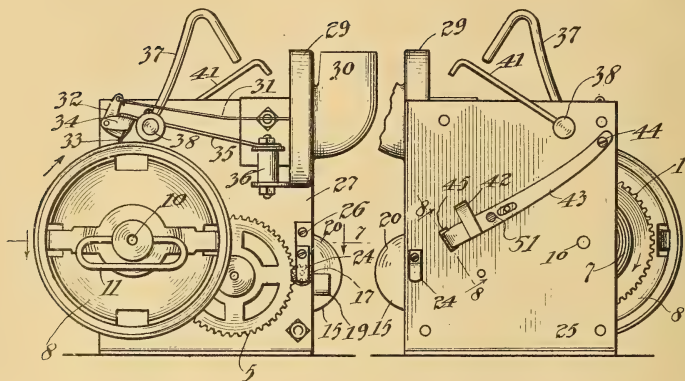


Fig. 2.

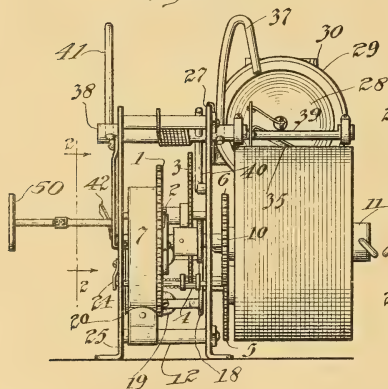
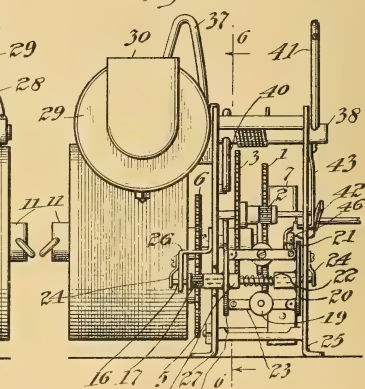


Fig. 4



16 18 Inventor:
Lewis Cole
By Sumner & Sumner,
Attys.

L. COLE.

PHONOGRAPH.

APPLICATION FILED SEPT. 1, 1916.

1,244,588.

Patented Oct. 30, 1917.

2 SHEETS—SHEET 2.

Fig. 5.

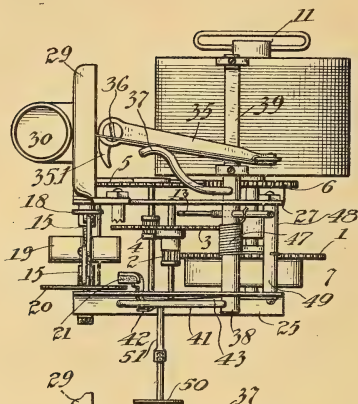


Fig. 8.

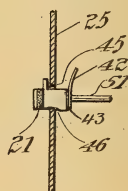


Fig. 6.

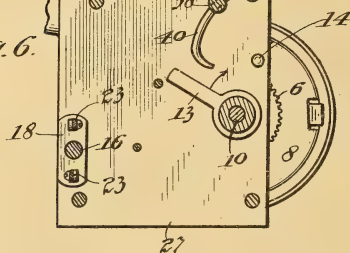
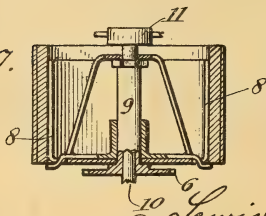


Fig. 7.



Witnesses:
W. C. Smith

Inventor:
Lewis Cole,
By Hummel & Hummel,
Attys

UNITED STATES PATENT OFFICE.

LEWIS COLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO TALK-SING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH.

1,244,588.

Specification of Letters Patent.

Patented Oct. 30, 1917.

Application filed September 1, 1916. Serial No. 118,025.

To all whom it may concern:

Be it known that I, LEWIS COLE, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates to phonographs suitably arranged for use in toys and other devices, such as cigar cutters, clocks, dolls, savings banks, etc.

The objects of the invention are to provide simplified and improved means for starting, stopping and governing the speed of devices of this class; to provide improved means for automatically disengaging the stylus at the end of operations of the device and restoring the stylus carrying arm to its initial position, ready to repeat operations; and to provide improved means for causing the stylus to resiliently engage a record.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a phonograph constructed according to this invention.

Fig. 2 is a rear view.

Fig. 3 is a left side view.

Fig. 4 is a right side view.

Fig. 5 is a plan view.

Fig. 6 is a sectional elevation taken on the line 6—6 of Fig. 4.

Fig. 7 is a detail in section showing the record support.

Fig. 8 is a sectional detail taken on the line 8—8 of Fig. 2, and shows part of the starting and stopping spring lever.

This invention provides simplified and improved devices in the structure of small phonographs whereby the same may be produced at low cost, but still permit of a great number of operations thereof without any appreciable deterioration of the mechanism.

Power is supplied to the device by means of a small clock mechanism incorporated therein and comprising gears 1 to 6 inclusive, connecting a spring motor 7 with a rotatable record support 8. The record support 8 is fixed to a sleeve 9 surrounding a winding spindle 10 journaled therein. The winding spindle 10 is provided with a suit-

able key 11, and the inner end of the driving spring 7 is secured as usual to the winding spindle, the latter also having the usual ratchet connection (not shown) to gear 1, whereby the spring may be wound without rotating the gear and serves to drive the gear during the unwinding of the spring. The outer end of the spring 7 is secured to a tie rod 12, Fig. 3. For the purpose of limiting the winding of spring 7, spindle 10 carries fast an arm 13 in position to engage a fixed stop pin 14, Fig. 6.

The starting and stopping and the speed of the device are controlled through a governor 15. The latter comprises a spindle 16 to which are secured pinion 17 and arm 18. The pinion 17 receives motion from the gear 5 with which it meshes, at such speed as to cause the small weights 19 of the governor to become effective in shifting a disk 20 slidable on spindle 16 into engagement with pad 21, with more or less pressure, and against the action of spring 22 surrounding the spindle. The weights 19 are supported in balanced relation by the pivoted links 23 connecting arm 18 with disk 20. Longitudinal thrust of spindle 16 is prevented by springs 24 bearing against the ends of the spindle and supported by the frame plate 25 and bracket 26 on frame plate 27.

The sound reproducing disk 28 is mounted in the sound box 29 supported on frame plate 27. The disk or diaphragm 28 has attached centrally thereto a wire 31 connecting it to a pivoted stylus arm 32, the latter being provided with a jewel tip 33 for engagement with record surfaces. The stylus arm 32 is pivoted to an ear 34 of a swinging arm 35 which in turn is pivoted on a fixed post 36. Arm 35 is made of spring steel or some other resilient material to afford the required pressure between the stylus and record and still permit the stylus arm to be rocked clear of the record without necessitating an extra pivot or universal joint. The arm 35 has a lateral extension 35.1 coacting with a restoring cam member 37 on an oscillating shaft 38. When shaft 38 is rocked, the swinging arm is restored to normal position, after being driven along the record surface by engagement therewith.

For the purpose of raising and lowering

the stylus out of and into engagement with the record surface, the shaft 38 has a cut away portion 39 extending below the swinging arm 35 along its path of travel. Thus, this portion of the shaft is made eccentric to its axis and normally permits the stylus to engage the record surface. Near the end of operations of the device, the shaft 38 is rocked on its axis and cams the arm 35 upwardly against its spring action, thus causing the stylus to be raised clear of the record before cam arm 37 engages the extension 35.1 and restores arm 35 to normal position. The arm 13 on shaft 10 serves to rock shaft 38 as above described, by engagement with arm 40 fast to the latter shaft, Fig. 6. This rocking motion of shaft 38 also results in an arm 41 fast thereto engaging a curved extension 42 of a spring arm 43 mounted on the supporting frame 25 by screw 44. Arm 43 is bent as shown in Fig. 5 and passes through a slot 45 in the frame 25. At its free end, it carries a brake pad 21 for engagement with the rotating disk 20 of the governor, when this disk is shifted inwardly along shaft 16. The arm 43 therefore provides a resilient means for restraining the rotation of shaft 16 beyond the desired speed. When the arm 41 engages the extension 42 at the end of operations of the device, the arm 43 is shifted so that the pad 21 firmly grips the disk 20 and stops the machine. Arm 43 then assumes the position shown in Fig. 8, a notch 46 therein engaging the edge of slot 45, thus retaining the arm 43 in moved position.

For the purpose of restoring shaft 38 to its normal angular position as shown in Fig. 2, a coiled spring 47 surrounds the shaft and bears between the pin 48 thereof and the bar 49 connecting the frames 25 and 27. The restoring of shaft 38 takes place upon a subsequent rotation of shaft 10 under the action of the winding key 11. The winding motion of the shaft is in a direction opposite to that indicated by the arrow in Fig. 6. Thus, arm 13 moves out of engagement with the arm 40 on shaft 38. The brake pad 21 still remains in engagement with disk 20, due to the fact that notch 46 in the arm 43 still resiliently engages the edge of slot 45. In order to release the arm 43 for the purpose of setting the device in operation, arm 43 is provided with a push-button 50, the stem 51 of which is riveted to the arm.

In operating the device, the winding key 11 is turned to the right, Fig. 1, winding the spring 7 until arm 13 on the winding spindle 10 engages stop pin 14, Fig. 6. Then, upon depressing the push-button 50, the arm 43 is disengaged from the edge of slot 45 and springs to the position in which it is shown in Fig. 5, permitting rotation of the governor 15 and connected gearing under the action of spring 7. Spindle 10 then ro-

tates in the direction indicated by the arrow in Fig. 6, while the stylus carrying arm 35 rocks around its pivot formed by post 36. This rocking motion of arm 35 is due to the stylus engaging the rotating record. Finally, the arm 13, Fig. 6, engages the arm 40, rocking the shaft 38 so that a rounded portion of the shaft engages the stylus carrying arm, lifting the same free from the record. The bent cam arm 37, also rigid with shaft 38, engages the extension 35.1 of arm 35, restoring this arm to normal position as shown in Fig. 5. Then arm 41, rigidly carried by shaft 38, engages the bent portion 42 of the spring arm 43, causing the pad 21 to firmly grip disk 20 and prevent further rotation of the same and the mechanism geared thereto.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:—

1. A phonograph, comprising a diaphragm, a record support, means for driving said record support, a pivoted stylus carrying arm of spring material and adapted to resiliently bear toward said record support, a lever pivoted on the end of said arm, having a stylus mounted on one end thereof, and a connection between the opposite end of said lever and the center of said diaphragm.

2. A phonograph, comprising a diaphragm, a record support, means for driving said record support, a pivoted stylus carrying arm of spring material and adapted to resiliently bear toward said record support, a lever pivoted on the end of said arm, having a stylus mounted on one end thereof, a connection between the opposite end of said lever and the center of said diaphragm, and means operated by said driving means for disengaging the stylus from a record against the resilient action of the stylus carrying arm and returning the latter to its normal position.

3. A phonograph, comprising a diaphragm, a record support, means for driving said record support, a pivoted stylus carrying arm adapted to rock laterally of said record support, a lever pivoted on the end of said arm, having a stylus mounted on one end thereof, a connection between the opposite end of said lever and the center of said diaphragm, and means operated by said driving means for disengaging the stylus from the record and returning the stylus carrying arm to its normal position, said means comprising an oscillating shaft provided with a flattened portion below the path of travel of said stylus carrying arm

and a cam member rigid on said shaft in position to engage and cam said stylus carrying arm to its normal position.

5 4. A phonograph, comprising a record support, a driving mechanism therefor, a rotating governor for controlling the speed of said driving mechanism, a spring arm adapted to resiliently engage said governor,

and a cam member operated by said driving mechanism and shaped to force said spring arm into engagement with said governor for the purpose of stopping the action of said driving mechanism. 10

Signed at Chicago this 25th day of Aug., 1916.

LEWIS COLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CABINET FOR TALKING MACHINES.

1,844,944 ----- C. Beecroft.
Patented Oct. 30, 1917.
Filed May 27, 1915.

C. BEECROFT.
CABINET FOR TALKING MACHINES.
APPLICATION FILED MAY 27, 1915.

1,244,944.

Patented Oct. 30, 1917.

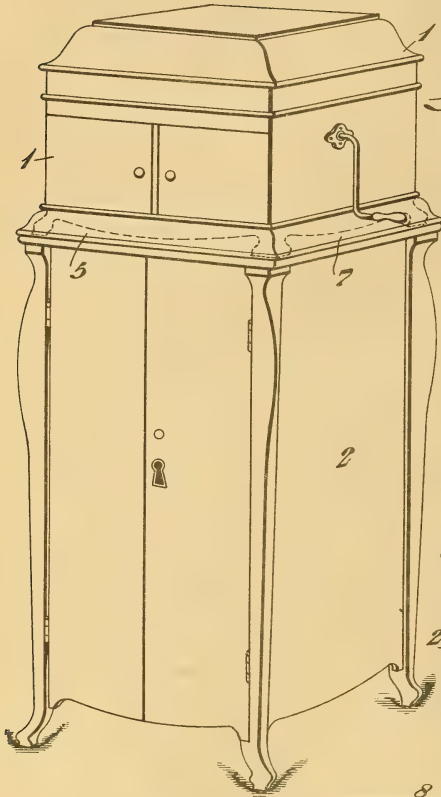


Fig. 1.

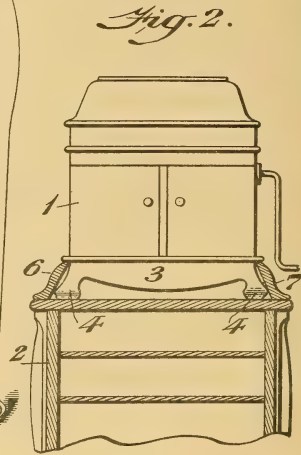


Fig. 2.

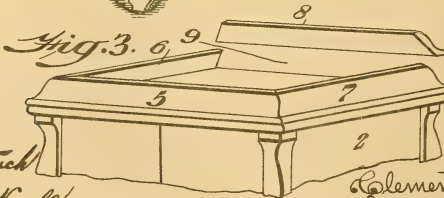


Fig. 3.

WITNESSES

H. P. Dietrich

P. F. Nagle

INVENTOR

BY

Clement Beecroft
Wiederheim & Fairbank
ATTORNEYS

UNITED STATES PATENT OFFICE.

CLEMENT BEECROFT, OF PHILADELPHIA, PENNSYLVANIA.

CABINET FOR TALKING-MACHINES.

1,244,944.

Specification of Letters Patent.

Patented Oct. 30, 1917.

Application filed May 27, 1915. Serial No. 30,731.

To all whom it may concern:

Be it known that I, CLEMENT BEECROFT, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Cabinet for Talking-Machines, of which the following is a specification.

My invention consists in providing the record cabinet of a talking machine with means for controlling the latter on said cabinet so that it may remain to all intents and purposes a fixture of the cabinet, and the cabinet and talking machine may be moved as one without liability of the machine being removed from the cabinet, and the machine cannot be displaced from its position on the cabinet in handling or operating the same.

The invention is satisfactorily illustrated in the accompanying drawing, but the important instrumentalities thereof may be varied, as long as they are included in the scope of the claims.

Figure 1 represents a perspective view of a cabinet for a talking machine embodying my invention including such machine thereon.

Fig. 2 represents a vertical section of a portion thereof including a front elevation of the talking machine thereon.

Fig. 3 represents a perspective view of a portion of the cabinet.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings.

1 designates the casing of a talking machine known as such, and 2 designates the record cabinet on the top of which said casing is imposed and supported, said casing having on the corners of its base 3 the legs 4 which rest on said top.

In order to secure said casing to said cabinet and prevent displacement thereof I secure to the top of the latter a frame composed of the cleats 5, 6, 7 and 8 which rise respectively from the several sides thereof, the cleats 5, 6, and 7 being primarily fixed to the cabinet, and the remaining cleat 8 being primarily separated therefrom forming a gate for the opening 9 in a side of the

frame, but which is closed when said cleat 8 is in position in said opening.

The cleats are adapted to incline inwardly whereby when the separated cleat 8 is removed, the casing 1 may be placed upon the cabinet, its base portion and legs sliding or passing under the side cleats 6 and 7 and entering under the front cleat 5. Then the cleat 8 is applied in position and secured, when as will be seen it preserves the continuity of the several cleats and the casing is interlocked with the cabinet by the several cleats and so retained on the cabinet that it cannot shift thereon in any lateral directions. Furthermore, as the cleats incline inwardly and overhang the base and legs of the casing, they form dovetailed joints with said base and legs and so prevent the casing from being raised from the cabinet. Then the molding on the sides of the casing of the machine is adapted to be seated on the tops of the cleats and serve additionally to steady the casing most firmly on said cleats, and consequently on the top of the cabinet, an important feature for a talking machine.

Should it be desired to remove the machine from the cabinet, the cleat 8 is disconnected from the cabinet whereby the opening 9 is uncovered and so the machine may be slidingly moved on the top of the cabinet through said opening and disengaged from the cleats 5, 6, and 7 without disturbing the other cleats.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. A cabinet for a talking machine having a top on which the casing of the machine is adapted to be supported, an inclosure rising from said top, and formed of cleats which are adapted to engage the sides of the base, certain of the cleats being fixed to said top and another cleat forming a gate for entrance into the space of the inclosure, and means for holding the gate in closed position and permitting its opening.

2. A cabinet for a talking machine having a top on which the casing of the machine is

adapted to be supported, cleats rising from
said top forming an inclosure for the sides
of the base of said machine and adapted to
interlock therewith, one of said cleats being
5 separate from the other cleats and movable
forming a gate for the insertion of said base
into the space of said inclosure, the inner

sides of the cleats overhanging so as to form
interlocking joints with said base.

CLEMENT BEECROFT.

Witnesses:

JOHN A. WIEDERSHEIM,
N. BUSSINGER.

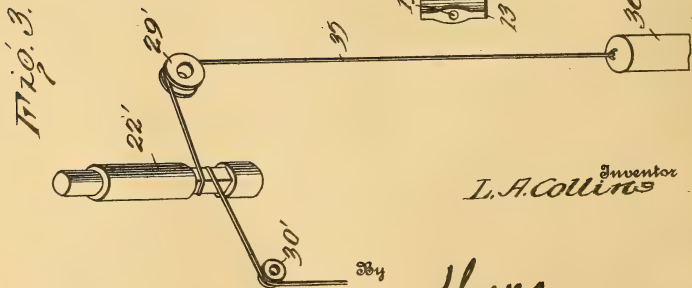
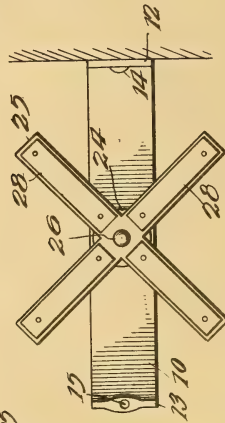
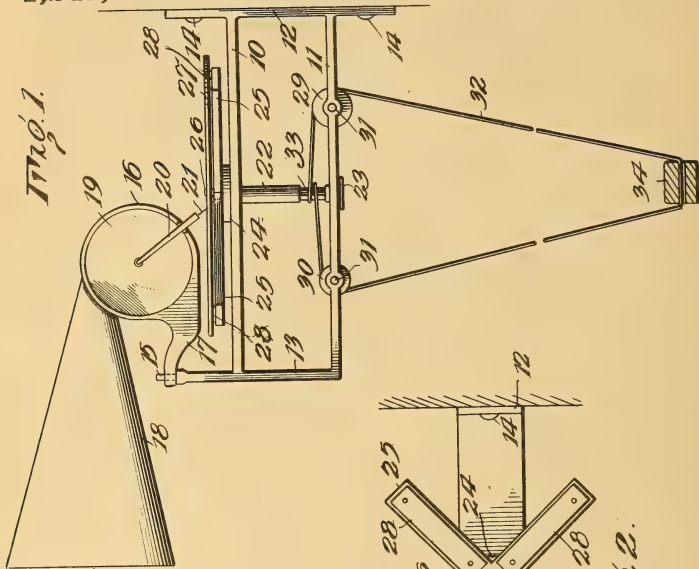
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

TOY PHONOGRAPH.

1,245,568----- L. A. Collins,
Patented Nov. 6, 1917,
Filed Nov. 21, 1916.

APPLICATION FILED NOV. 21, 1916.

Patented Nov. 6, 1917.



Thamsey, Attorneys.

UNITED STATES PATENT OFFICE.

LEE A. COLLINS, OF LOUISVILLE, KENTUCKY.

TOY PHONOGRAPH.

1,245,568.

Specification of Letters Patent.

Patented Nov. 6, 1917.

Application filed November 21, 1916. Serial No. 132,671.

To all whom it may concern:

Be it known that I, LEE A. COLLINS, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Toy Phonographs, of which the following is a specification.

This invention relates to an improved phonograph and has as its primary object to provide a device of this character which will constitute an attractive toy.

The invention has as a further object to provide a toy phonograph designed for attachment to a wall or other support and which may be easily mounted in position to be operated.

And the invention has as a still further object to provide an improved and simple means for manually operating the phonograph.

Other and incidental objects will appear as the description proceeds and in the drawings wherein I have illustrated the preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a side elevation of my improved phonograph showing the manner in which the device may be connected to a wall or other support and particularly illustrating the mechanism employed for manually rotating the record carriage of the phonograph.

Fig. 2 is a top plan view of the device with the sound box removed, and

Fig. 3 is a fragmentary perspective view showing a slightly modified form of operating mechanism for the device.

In carrying out the invention, my improved phonograph is formed with a body or frame including upper and lower parallel bars 10 and 11 connected at their inner extremities by a transversely extending strip or attaching member 12 and at their outer extremities by an upstanding post 13. The frame may be integrally formed, if desired or if preferred, the attaching member 12 and the post 13 may be connected to the bars 10 and 11 in any approved manner. The attaching member 12 projects, at its extremities, above and below the bars 10 and 11 for receiving screws or other suitable fastening devices 14 by which the device may be connected to a wall or other

support as illustrated in Figs. 1 and 2 of the drawing. The post 13 is extended above the bar 10 and at its upper end is provided with an upstanding pivot pin 15. Mounted to swing about this pin, is a sound box 16. This sound box is formed with a laterally extending arm 17 which, adjacent its free extremity, is directed upwardly and provided with an opening to freely receive the pin 15 with the arm thus pivotally connecting the sound box with the post 13. The sound box 16 is hollow and extending forwardly and outwardly from the upper side thereof is a suitable horn 18. Closing the front side of the sound box 16 is a diaphragm 19 of approved character and connected to the said diaphragm is a pivoted stylus 20. At its lower extremity, the stylus is formed to detachably receive the usual needle 21. The sound box and its associated parts as thus described provides the reproducing mechanism of the phonograph.

Rotatably mounted upon the frame of the device is a record carriage including a shaft 22 extending transversely through the bars 10 and 11 of the frame and suitably journaled therein. Connected to the lower end of the shaft is a suitable washer 23 confronting the bar 11 and fitted over the upper extremity of the said shaft is a washer 24. Removably fitted on the upper extremity of the shaft to rotate therewith and seating against the said washer is a record receiving member 25. This member is preferably formed of crossed strips secured together at their intersection and bored to snugly receive the upper terminal of the shaft, as particularly shown in Fig. 1. The shaft 22 is preferably provided with a reduced upper terminal 26 projecting above the said member for removably receiving a record disk as conventionally shown at 27 in Fig. 1. Connected to the upper sides of the strips of the record receiving member 25 are facings which may be formed of cardboard, cloth, or other soft material. These facings are disposed to receive the disk 27 and will prevent the scratching thereof as well as rotation of the disk independent of the member 25. As particularly shown in Fig. 1, the record receiving carriage is disposed to support the disk 27 with the needle 21 resting thereagainst in the usual manner. For removing the disk, the sound box is swung to one side upon the pivot pin 15.

Mounted upon the lower bar 11 of the

frame at opposite sides of the shaft 22 are pulleys 29 and 30. These pulleys are received in suitable slots in the said bar and are rotatably supported by pivot pins 31 extending transversely through the bar. Trained over the pulleys 29 and 30 is an endless flexible element or cord 32 which is wrapped around the shaft 22 of the record receiving carriage. The shaft 22 is preferably formed with a squared portion 33 for receiving the cord so that the cord may grip the shaft without slipping. In this connection, attention is directed to the fact that the roller 29 is somewhat larger than the roller 30. The reaches of the cord between the said rollers and the shaft 22 will thus be supported by the said rollers one above the other so that the cord will not become tangled about the said shaft. The cord 32 is arranged to depend in a loop below the rollers and is threaded loosely through a weighted element 34 adapted to tension the cord about the shaft 22.

In use, the record disk 27 is positioned upon the member 25, as previously described, and the needle 21 rested upon the disk adjacent its outer margin, in the usual manner. The cord 32 is then grasped by the right hand of the operator below the pulley 29 with the fingers of the left hand loosely engaging the cord below the pulley 30. The cord is then pulled downwardly by the right hand to rotate the shaft 22 and consequently rotate the disk 27 when the needle 21 and its associated parts will act to reproduce the record upon the disk. As the cord is pulled downwardly by the right hand, the fingers of the left hand are employed to tension the cord for regulating the speed of the rotary movement of the record receiving carriage with the weight 34 acting to tension the cord about the squared portion 33 of the shaft 22 to prevent the said cord from slipping.

It will, therefore, be seen that I provide an exceedingly simple construction for the purpose set forth and a device of a nature to provide an exceedingly attractive toy.

In Fig. 3 of the drawings, I have illustrated a slight modification of the invention which relates more particularly to the operating mechanism for the record receiving carriage of the device. In this modification, the shaft of the said carriage is indicated at 22' and the pulleys at opposite sides of the said shaft at 29' and 30' respectively, all of these parts being identical with the preferred form of the invention. Trained over the pulleys 29' and 30' and wrapped about the squared portion of the said shaft is a flexible element or cord 35 one end of which is free and to the opposite end of which is connected a weighted element 36. The free end of the cord is grasped and pulled in one direction until the weight 36 moves to a po-

sition adjacent the pulley 29'. Then, by loosening the grasp upon the free end of the cord, the weight 36 will gravitate to rotate the shaft 22' and consequently turn the record receiving carriage, the grasp upon the free end of the cord being employed for tensioning the cord to regulate the speed of rotation of the carriage. In some instances, it may be found preferable to employ this modified arrangement and it will be seen that the construction provides a very simple and effective means for operating the device.

Having thus described my invention, what is claimed as new is:

1. A device of the character described including a body, a record receiving carriage rotatably mounted thereon and including a shaft, reproducing mechanism mounted upon the body to cooperate with a record arranged upon the carriage, and manually operable means connected to said shaft for rotating the carriage, said means including an endless flexible element wrapped about the shaft and normally extending therefrom to provide a loop, and a weighted element threaded upon the said flexible element and received by the said loop with the said weighted element normally tensioning said flexible element about the shaft.

2. A device of the character described including a body frame, a record receiving carriage rotatably mounted thereon and including a shaft, reproducing mechanism mounted upon the frame to cooperate with a record upon said carriage, pulleys mounted upon the frame at opposite sides of the said shaft, and a flexible element arranged about the said shaft and trained over said pulleys with the said flexible element operable for rotating the said carriage.

3. A device of the character described including a body frame provided with spaced bars, an attaching member connecting the said bars at one extremity of the frame, a post connecting the bars at the opposite extremity of the frame, a record receiving carriage mounted upon the frame and including a shaft extending transversely between and journaled upon said bars, reproducing mechanism mounted upon the said post to cooperate with a record arranged upon the carriage, and a flexible element connected to said shaft with the said flexible element operable for rotating the carriage.

4. A device of the character described including a body, a record receiving carriage rotatably mounted thereon and including a shaft, reproducing mechanism mounted upon the body to cooperate with a record arranged upon the carriage, and an endless flexible element engaged about the shaft with the said element forming a free loop arranged to be grasped for manually rotating the carriage.

5 A device of the character described including a body, a record receiving carriage rotatably mounted thereon and including a shaft, reproducing mechanism mounted upon the body to cooperate with a record arranged upon the carriage, an endless flexible element wrapped about the shaft with the said

element arranged to be grasped for manually rotating the carriage, and means slidable upon said flexible element and acting to normally tension the element about said shaft. 10

In testimony whereof I affix my signature.

LEE A. COLLINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SYNCHRONIZATION OF MACHINES FOR RECORDING AND
REPRODUCING SOUNDS AND MOVEMENTS.

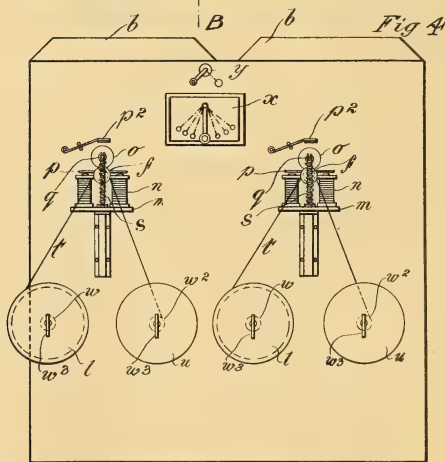
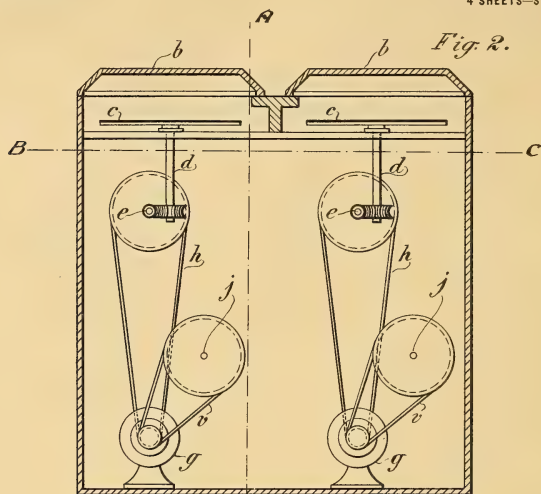
1,245,834 ----- C. H. Verity,
Patented Nov. 6, 1917,
Filed May 23, 1917.

C. H. VERITY,
 SYNCHRONIZATION OF MACHINES FOR RECORDING AND REPRODUCING SOUNDS AND MOVEMENTS.
 APPLICATION FILED MAY 23, 1917.

1,245,834.

Patented Nov. 6, 1917.

4 SHEETS—SHEET 2.



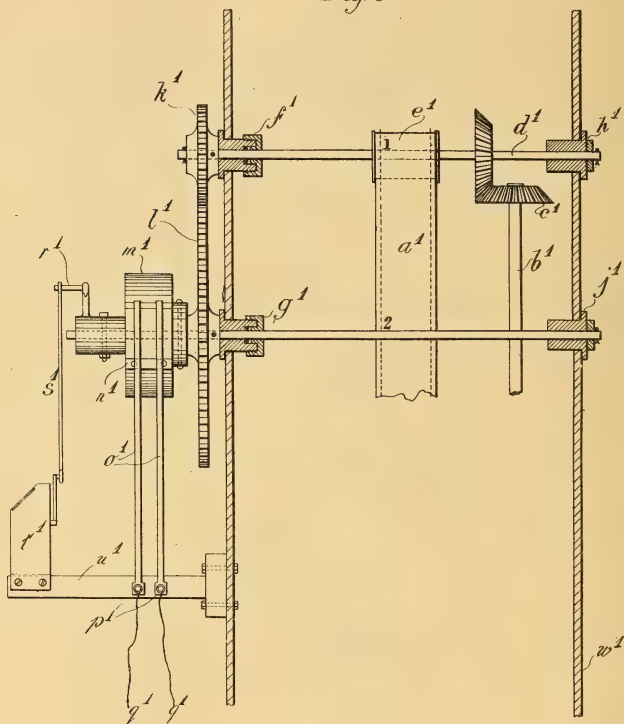
Inventor:
 Claude Hamilton Verity
H M Phelps
 Attorney

C. H. VERITY.
 SYNCHRONIZATION OF MACHINES FOR RECORDING AND REPRODUCING SOUNDS AND MOVEMENTS.
 APPLICATION FILED MAY 23, 1917.

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Patented Nov. 6, 1917.
 4 SHEETS—SHEET 3.

Fig 5



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4 SHEETS—SHEET 4.

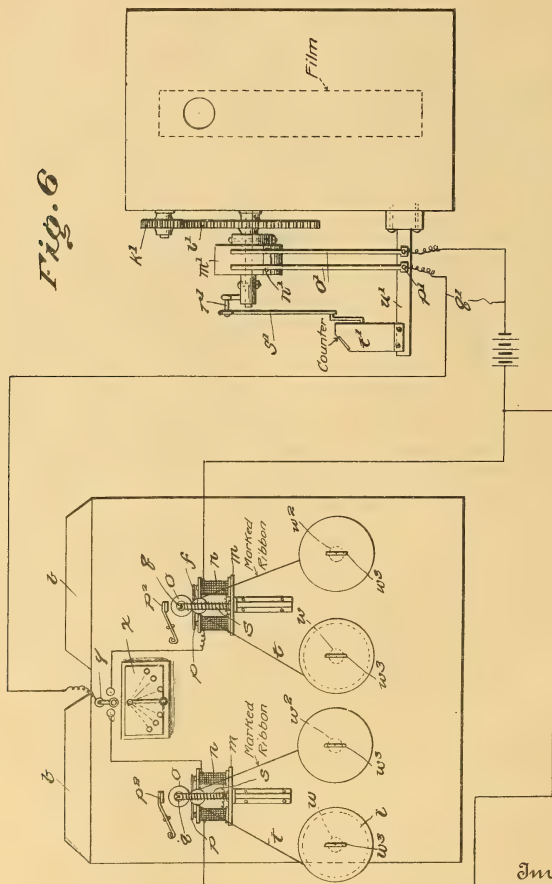


Fig. 6

Inventor

C. H. Verity.

By

H. M. Phelps

Attorney

UNITED STATES PATENT OFFICE.

CLAUDE HAMILTON VERITY, OF LEEDS, ENGLAND.

SYNCHRONIZATION OF MACHINES FOR RECORDING AND REPRODUCING SOUNDS AND MOVEMENTS.

1,245,834.

Specification of Letters Patent.

Patented Nov. 6, 1917.

Application filed May 23, 1917. Serial No. 170,531.

To all whom it may concern:

Be it known that I, CLAUDE HAMILTON VERITY, a subject of His Majesty the King of England, and resident of Leeds, in the county of York, Kingdom of England, have invented certain new and useful Improvements in the Synchronization of Machines for Recording and Reproducing Sounds and Movements, of which the following is a specification.

This invention relates to improvements in means for the synchronization of machines for recording and reproducing sounds and movements.

According to this invention I employ a moving picture camera in conjunction with a sound producing machine, the sounds and movements are synchronically recorded in the following way:—A sprocket wheel is attached to a spindle mounted inside the camera, and on the extended end thereof is a gear wheel geared to a larger gear wheel which is mounted on a spindle mounted on the camera. On the end of this spindle is a drum which carries a metal segment, and attached to the side of the camera are metal contact brushes electrically connected to electromagnets, fixed on the sound reproducing machine in such a way that one revolution of the drum allows an electric circuit to pass through the magnets. Operatively connected to the spindle, on which the drum is mounted, is a mechanically geared counter, so that each revolution of the drum can be easily ascertained by watching the counter. When the movements are being photographed a shorthand writer sits facing the side of the camera on which the above fittings are mounted, and is provided with books or mounted rolls for writing down the words of a drama or speeches to be recorded. These books or mounted rolls are spaced and each space is numbered commencing from 1 up to any desired number.

I will now describe the relation between the mechanical counter and the numbered spaces in the book which the shorthand writer uses.

The film is set in the camera at the desired position for starting the record of the movements to be taken. This position is marked on the film by operating the shutter in front of the lens, at the same time the counter is set so as to show number 1 facing the shorthand writer.

As the film is carried through the camera by the sprocket wheel previously described, the numbers appearing on the counter will have a fixed relation to the speed of the film going through the camera. Supposing that the speech to be recorded commences on the first film exposed for recording the movements, the shorthand writer writes under the numbered spaces in the book the exact words spoken by the person making the speech and these shorthand notes synchronize with the numbers given on the counter.

The spindle carrying the drum may be extended through inside the camera and may carry a crank on which is fixed a spring-held wheel or marker which on each revolution of the spindle produces a mark on the film, the marks synchronizing with the numbers shown on the counter facing the shorthand writer.

I will now describe the attachments to the sound reproducing machine which will enable the method of synchronizing any definite position on the record with any definite position on the film, so that on reproduction in a theater these positions synchronize.

The sound reproducing machine is let into the stage out of view of the audience as much as possible, the horns are placed facing the audience and the body of the machine may be boxed in so that an operator sitting behind is out of view of the audience, or it may be placed behind the screen so that the numbers on the film may be read easily by the operator regulating the speed of the sound reproducing machine. The covers over the turntables are arranged to open so that the operator can conveniently arrange the record disks and there are two turntables, each being covered by an independent sound-proof cover. The spindles carrying the revolving turntables on which the record disks are placed are driven by horizontal spindles by means of worm gearing. The horizontal spindles are prolonged through the sides of the gramophone, and on their outer ends are attached standard sprocket wheels. An electric motor, with one or more belt drives to each horizontal spindle, is fixed inside the sound reproducing machine in a convenient position for this purpose, one motor to each turntable. This motor also drives by means of belts a spindle which goes through the side of the sound reproducing machine. On the outside of the

sound reproducing machine are fixed two stationary spindles, each on the left side of one of the sprocket wheels attached to the revolving spindles previously described. On the stationary spindles are placed two spools filled with perforated paper ribbon, these perforations being standard and fitting onto the sprockets on the sprocket wheels. A small platform is fixed under each sprocket wheel and on the platforms are placed the electromagnets previously mentioned, which electromagnets are employed for operating inked wheels or perforators as I will now describe.

Two electromagnets, each independent of the other, are placed on either side of each sprocket wheel spindle, and an armature is disposed above the magnets and is pivoted near one of its ends outside of the electromagnets and has its other end free to move between guides placed on the other side of the sprocket wheel. A spiral spring is employed for keeping the inked wheel or perforator normally away from the ribbon, which latter is passed between guides over the sprocket wheel and on to an empty spool which is frictionally held on the spindle operated by the electric motor previously described. The inked wheel is brought against the perforated ribbon by bringing the brushes in contact with the metal segment on the drum, at the same time the counter must show No. 1, also the position of the film is marked in the camera by making one exposure by operating the shutter in front of the lens, also a definite position is marked by means of a pointer and two holes in the gramophone disk, which holes engage two studs on the revolving platform. The standard speed for recording sounds is obtained by the correct size of pulleys on the motor, and the speed of the motor may be controlled by any well known means, and is under the control of the operator sitting before the perforated ribbon. A mirror may be placed above the perforated ribbon so that the operator may watch the pictures thrown on the screen.

As there are two disks for taking the gramophone records it will be noticed that a continuous program may be obtained.

I will now describe the method employed for recording a drama so that it can be synchronically reproduced in a theater by means of the moving picture machine and the sound reproducing machine combined.

Definite positions have been given to the apparatus above described, but the first time the ribbons and films are sent through their respective machines, the voice sounds are not collected on the records. The play commences and the camera and gramophone are started by the camera operator and automatically the marking of the film and ribbon proceeds absolutely synchronically.

This proceeds until the length of the film is exposed. When a fresh film is placed in the camera it is also necessary to produce the same exact positions as were necessary in the first exposures made, and this must be so with all subsequent films and ribbons.

It will now be seen that we have marked ribbons and marked films and these marks synchronize one with the other, and are made exactly at the same time. To definitely recognize these positions on reproduction it is necessary to lay the films and ribbons on long narrow platforms so that these marks are lettered or numbered whichever may be desired, but in such a way that each mark is consecutively lettered or numbered and each of the consecutive letters or numbers must synchronically agree. If the marks on the film are somewhat difficult to perceive or the marking apparatus in the camera is not used it is known that an exact definite length of film goes over the sprocket wheel to each revolution of the drum spindle so that by using a gage these distances can be measured off and the film marked. It is here necessary to refer to the fact that when the drama started the shorthand writer immediately commenced to put down the spoken words underneath the numbered spaces, these words synchronizing with the movements made by the actors are written down under the numbers as they appear on the counter before the shorthand writer, and this operation occurs as each film and ribbon are put through their respective machines.

I will now describe the method of recording the sounds on the disks so as to synchronize with the movements which have been already recorded on the film. The actors stand in front of the horn and have attached to them telephone receivers which are connected with the shorthand writer, who previously noted their speeches. The shorthand writer sits near the cinematograph machine which has attached to the sprocket wheel spindle a mechanical counter as used with the camera. The film and ribbon and counter are placed in the machines in the exact positions as when they were used for recording the movements and synchronically marking off the letters on the ribbon. Directly the shorthand writer notices that the counter shows a number which corresponds to a number in her book under which words have been spoken, she communicates these words by telephone to the actors, she acts as a prompter and also to make sure that the same words are used while the sounds are being recorded on the gramophone disks. I might here mention that the records disks have been placed in the same position as when the play was being acted on the stage. It will be noticed therefore that these spoken words will be clearly recorded and the ac-

tors watching their movements on the film will be able to produce their voice sounds so that they synchronize with the movements they are watching, while the additional safeguard is arranged for in the shorthand writer giving them the exact word they used at any exact period of the play.

During the recording of the sounds, the speed of the motor is controlled so as to keep the markings on the ribbon in synchronism with those shown on the picture screen.

In recording operas it will be necessary to record the sounds made by the orchestra independently of the songs given by the actors. The words are snug into the horn of the sound reproducing machine when the opera is being thrown on the screen in a similar way to the drama above described, in which case it might be necessary to employ two separate records for the purpose, the one record giving off the orchestral sounds recorded during the acting of the opera, and the other horn giving off the voice sounds. In this case the horizontal disks and spindles on which the records are revolved would all have to be connected by means of a fixed drive so that no variation in speed could occur between the records.

I will now describe the reproduction of the drama in a theater. It will be noticed in the invention described that all that is required for the reproduction of drama is the films, the spools of ribbon and the record. These can circulate in exactly the same way as the films do at the present time. After a short period of training, no skilled operator need travel about with any special apparatus. The moving picture machines in use at the present time do not require to be altered in any way. All that is necessary is that each theater provides itself with a standard sound reproducing machine as described in this invention.

The ribbons are fixed into the sound reproducing machine at the exact positions synchronically agreeing with the marked positions of the film which is placed in the moving picture machine, the girl operator sits behind the sound reproducing machine and watches the numbers or letters marked in any desired position on the films. The speed of the motor is regulated so as to approximate the speed of the letters on the ribbons passing before the operator to the speed of the letters or numbers on the pictures which can be seen by the operator. The records having been placed in their exact position on the turntables it will be seen that in reproduction no great skill is required to have a complete synchronization of the sounds and movements.

I will now describe the different parts of the said invention, reference being made to the drawings attached. Similar letters of reference indicate like parts in all figures.

Figure 1 is a sectional side elevation of the sound reproducing apparatus on the lines A—B of Figs. 2 and 3.

Fig. 2 is a front elevation with the casing removed.

Fig. 3 is a sectional plan on the line B—C of Figs. 1 and 2, and Fig 4 is a front elevation.

Fig. 5 is a section through the camera.

Fig. 6 is a diagrammatic view showing the sound reproducing machine and the moving picture machine, and the connections between same.

a a are the horns for directing the sound toward the audience, and

b b are the hinged lids of the sound reproducing machines.

c c are the revolving tables on which the records are placed. Each record has two holes in it, one in the center and one near, and these holes in the disk permit two fixed pins on the revolving table to give a definite position to the record when placed thereon. A countersunk hole on the disk denotes the place on which the needle must be placed to give the correct position when starting.

d is a spindle for driving the revolving table *c*, at the end of which spindle is a toothed wheel, and this gearing is operated by the worm drive and spindle *e*. The spindle *e* is belt or chain driven by means of a motor *g* through the belting *h*. On the spindle *e*, which projects through the casing of the sound reproducing machine is mounted a sprocket wheel *f*. A full spool of perforated paper or linen *t* is placed on the spindle *w*, and is passed over the sprocket wheel *f* on to the empty spool *u* on the spindle *w*². The spindle *w*² is driven by the motor *g* through the belting *c* and spindle *j*. The spools are held in position by springs which are pressed against the spools and held in position by the pivoted clips *w*³ as shown in the drawing. A wheel *o* is mounted on a beam or spindle *q* and rests against the ink pad *p*². This spindle *q* is pivoted on a pedestal *q*² as shown in the drawings, and is controlled by the draw bar *p*, which is operated by the magnet *n* and by the springs *s* in such a way that when an electric current is passed through the magnet, the draw bar *p* is pulled down so that the marker wheel *o* comes against the perforated ribbon *t*. Directly the current is broken, the spring *s* pulls up the marker wheel against the pad and in this way marks are made on the paper ribbon as it passes along on the sprocket wheel *f*. This marker *o* synchronizes with the contact of the contacts *o'* with the segment *n'* on the drum *m'*. Fig. 5. *m* is the platform on which is mounted the magnet *n* and the pedestal *q*² to which the spindle *q* is pivoted.

r is the guide for keeping the spindle *q* in a vertical direction when the marker *o*

is being operated by the magnet, and the free end of the spindle *g* oscillates in this guide *r*.

a is the accelerator for controlling the speed of the motor *g* operating the moving parts in the gramophone.

y is a two way switch which permits the wiring from the camera to be switched on either gramophone and also connects up the motor for driving same. Fig. 5 shows a sectional view of the inside of the camera. *a'* is a perforated film passing over the sprocket wheel *e'*. *b'* is the spindle of the bevel wheel *c'* which drives the spindle *d'* on which the sprocket wheel *e'* is mounted, and which is revolved by the operator. The spindle *d'* is carried in bearings *f'* *h'*, and at one end is mounted the toothed wheel *k'* which gears with the toothed wheel *l'*, mounted on a spindle which goes through the bearings *g'* and *j'*. On this spindle is mounted the wooden drum *m'* carrying a metal segment, so, that on one revolution of this drum an electric circuit can be made through the steel brushes *o'* and wires *q'* connected to the accumulator, and to the magnets *n* mounted on platform *m* as shown in Figs. 1 to 4. In this way the marks on the ribbon *t* are given a definite position with the film *a* at certain arranged distances as previously described. The spindle on which the drum *m'* is mounted has a crank *r'* fixed at the end to which a rod *s'* is connected for operating the mechanical counter *t'* mounted on the projection *u'* which is attached to the side of the camera. In this way the number of revolutions of the spindle is obtained. As previously described, words written under each number will synchronize with the movements which are photographed on the screen, and these definite movements are synchronically reproduced along with the voice sounds which are collected in the records when the drama is being produced. These voice sounds are recorded after the film has been photographed the actors speaking down the horn on to the record which is used for the recording of sounds, the operator controlling the speed of the gramophone so that the numbers on the ribbon *t* agree with the numbers seen on the picture screen which have been placed on the film for this purpose, as previously described.

In giving a combined reproduction the photograph is placed behind a curtain and the horn projecting beneath the curtain toward the audience. The sound reproducing machine operator can then watch the small portion of the pictures on the screen on which the numbers are marked and control the speed of the ribbon *t* so that the numbers thereon correspond correctly to the numbers on the film.

It is only in the preliminary reproduc-

tion of the play while the gramophone record is being made that the moving picture machine must have attached to it a similar arrangement as shown in Fig. 5 so that the prompter can read from his notes and communicate by telephone to the actors standing in front of the horn the exact words which are to be used, as said when the play was being photographed. All that is necessary to circulate for reproduction are the films and the ribbons, along with the records.

These will be circulated on the same lines as the films are circulated at the present time. This apparatus does not require a skilled man to go about with it. No alteration is required to the moving picture machines now used, and the only special apparatus required is the sound reproducing machines for the reproduction of voice sounds. In this way it will be possible for a drama to be put before the public practically as acted and spoken by the original players who are used for the production of it.

What I claim is:—

1. Apparatus for synchronizing sounds and movements, comprising a sprocket wheel on a camera and over which a film travels, a drum carrying a metal segment, means for rotating said sprocket wheel and drum simultaneously, a counter which is operated during the rotation of the wheel and drum, contacts which coöperate with said segment, a sound recording machine, a ribbon, means for moving the ribbon when operating the recording machine, an electromagnet electrically connected with the contacts, and means operated by said electromagnet for indicating marks on said ribbon, in synchronism with the movement of the film.

2. Apparatus for synchronizing sounds and movements, comprising a sprocket wheel within a camera and over which a film travels, a drum carrying a metal segment, means for rotating said sprocket wheel and drum simultaneously, a counter operated during the rotation of said wheel and drum, contacts coöperating with said segment, a sound recording machine including a motor, a sprocket wheel driven by the motor, a ribbon which travels over the last mentioned sprocket wheel, a marker adapted to mark said ribbon, an electro-magnet electrically connected with the contacts, and an armature operatively connected with the marker and adapted to be actuated by said electromagnet to mark the ribbon in synchronism with the movement of the film.

3. Apparatus for synchronizing sounds and movements comprising a sprocket wheel within a camera and over which a film travels, a drum carrying a metal segment, means for rotating said sprocket wheel and drum simultaneously, a counter op-

erated during the rotation of said wheel and drum, contacts cooperating with said segment, a sound recording machine including a motor, a sprocket wheel driven by the motor, a ribbon which travels over the last mentioned sprocket wheel, a marker adapted to mark said ribbon, an armature which carries the marker, a spring connected to said armature, and an electro-magnet electrically connected to the contacts whereby to mark the ribbon in synchronism with the movement of the film.

4. Apparatus for synchronizing sounds and movements comprising a sprocket wheel within a camera and over which a film travels, a drum carrying a metal segment, means for rotating the said sprocket wheel and drum simultaneously, a counter operated during the operation of said wheel and drum, contacts cooperating with said segment, a sound recording machine including a motor, a sprocket wheel, a stationary spindle, a rotatable spindle operated by the motor, means connected to the motor for operating the sprocket wheel and the rotatable spindle, a ribbon which passes from the stationary spindle over the sprocket wheel on to the rotary spindle, an inking wheel to mark the ribbon, a pivoted beam which carries the inking wheel, a spring connected to said beam, an armature carried by the beam, and an electro-magnet electrically connected to the contacts to attract the armature to actuate the marker.

5. Apparatus for synchronizing sounds and movements comprising a sprocket wheel within a camera and over which a film travels, a drum carrying a metal segment, means for rotating said sprocket wheel and drum simultaneously, a counter operated during the operation of said wheel and drum, contacts cooperating with said segment, two electro-magnets electrically connected to the contacts, two sound recording machines including two motors, two ribbons moved by the motors, two indicating devices adapted to be operated by the electro-magnets to mark the ribbons, and a switch to control the electric circuits between the contacts and the electro-magnets.

6. Apparatus for synchronizing sounds and movements, comprising a sprocket wheel within a camera and over which a film travels, a drum carrying a metal segment, means for rotating said sprocket wheel and drum simultaneously, a counter operated during the rotation of said wheel and drum, contacts cooperating with said segment, two

electro-magnets electrically connected to the contacts, two sound re-producing machines including two motors, two ribbons moved by the motors, two marking devices adapted to be operated by the electromagnets to mark the ribbons, a two-way switch to control the electric circuits between the contacts and the electromagnets, and means for controlling the speeds of the motors.

7. Apparatus for synchronizing sounds and movements, comprising a moving picture machine, a marked film operated by said machine, a sound reproducing machine including a record, a marked ribbon moved by the sound reproducing machine, means for simultaneously driving the record and the ribbon, and means for controlling the speed of said driving means whereby the movement of the record can be synchronized with the movement of the film by observing the film markings on the screen and the markings on the ribbon and approximating their speeds of movement.

8. The combination of a marked film, of a sound recording machine including a motor and record, and synchronizing means between the marked film and the sound recording machine including a correspondingly marked ribbon operatively connected to the motor, and means for controlling the movement of the motor whereby the record is located to accord with pictures projected on the film.

9. The combination of a camera including a film, a counter, means for moving the film and actuating the counter, sound recording means including a record and a motor, a ribbon moved by the motor, a marking device located to mark the ribbon, and means operated by the means which moves the film to operate the marker and the counter to indicate on the ribbon definite locations on the film, said locations on the film being indicated by the counter.

10. The herein-described method of preparing sound records and moving picture films to be synchronized, consisting in first marking a ribbon which is moved in accord with a sensitized film, correspondingly marking the ribbon and the developed film to indicate corresponding areas on the ribbon and film, then making a sound record which is operated in unison with the ribbon while the developed film is moved in synchronism with said ribbon.

In testimony whereof I have hereunto signed my name.

CLAUDE HAMILTON VERITY.

DRIVE MECHANISM FOR COMBINED PHONOGRAPHS AND
PLAYER PIANOS.

1,246,053 ----- M. Clark.

Patented Nov. 13, 1917.

Filed Feb. 21, 1916.

M. CLARK.
 DRIVE MECHANISM FOR COMBINED PHONOGRAPHS AND PLAYER PIANOS.

1,246,053.

APPLICATION FILED FEB. 21, 1916.

Patented Nov. 13, 1917.

4 SHEETS—SHEET 1.

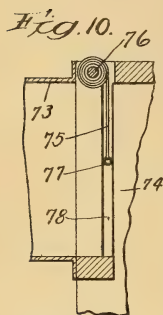


Fig. 4.

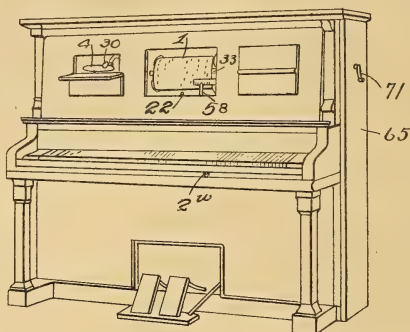


Fig. 1.

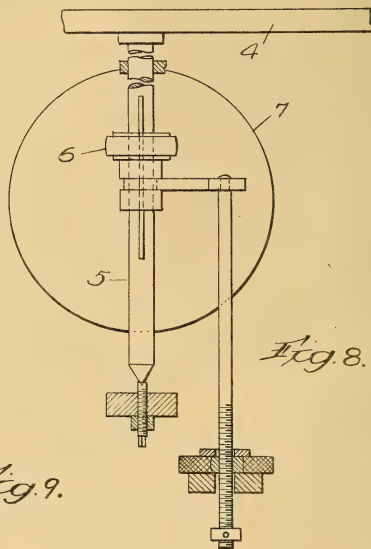
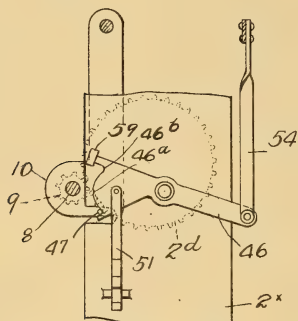


Fig. 8.

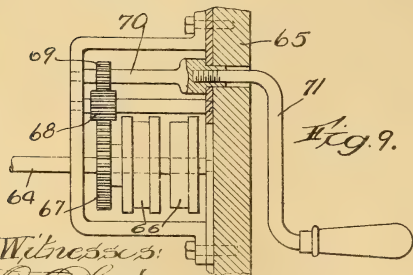


Fig. 9.

Witnesses:
Edna M. MacIntosh

Edna M. MacIntosh

Inventor
 Melville Clark.

by *Burton Burton*
 his Attys.

M. CLARK.

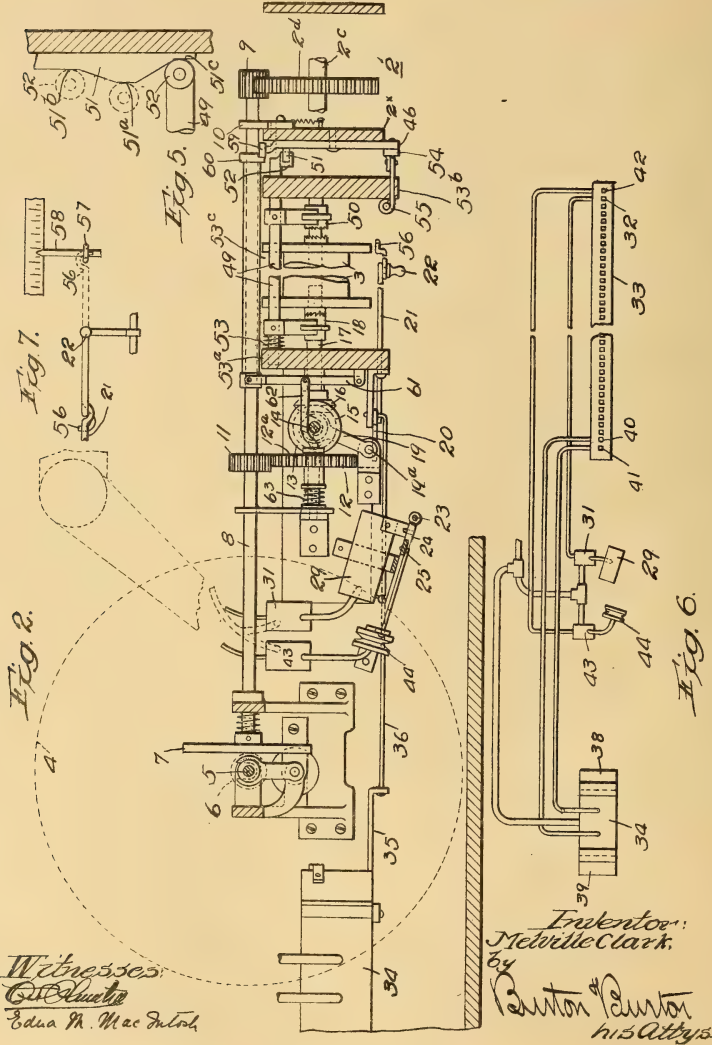
DRIVE MECHANISM FOR COMBINED PHONOGRAPHS AND PLAYER PIANOS.

APPLICATION FILED FEB. 21, 1916.

1,246,053.

Patented Nov. 13, 1917.

4 SHEETS—SHEET 2.



M. CLARK.

DRIVE MECHANISM FOR COMBINED PHONOGRAPHS AND PLAYER PIANOS.

APPLICATION FILED FEB. 21, 1916.

Patented Nov. 13, 1917.

4 SHEETS—SHEET 3.

1,246,053.

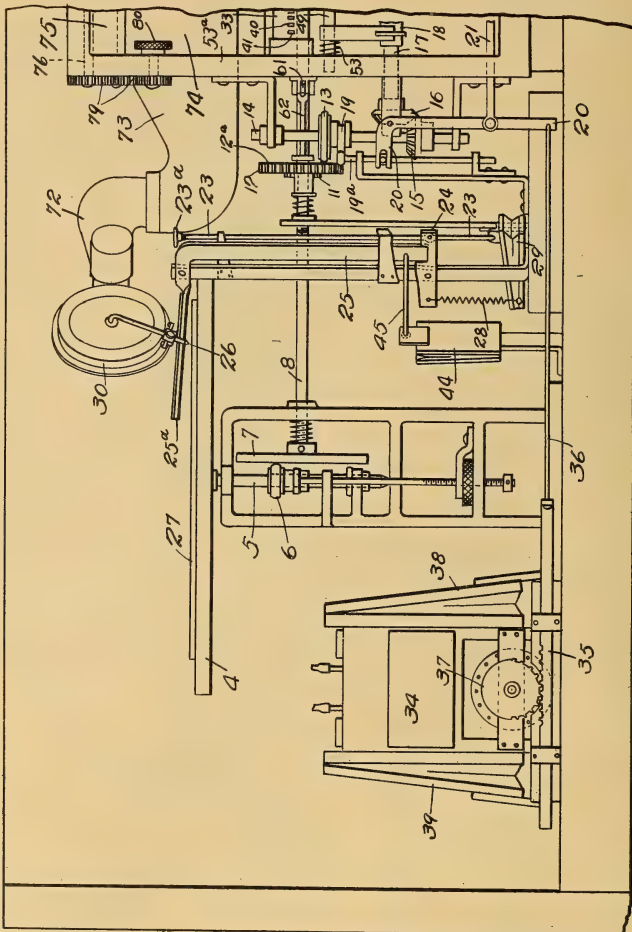


Fig. 3.

Witnesses:

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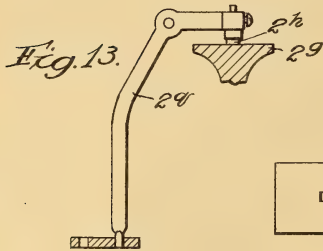
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DRIVE MECHANISM FOR COMBINED PHONOGRAPHS AND PLAYER PIANOS.

Patented Nov. 13, 1917.

1,246,053.



Edna M. Mac Intosh

by Burton & Burton
his Attys:

UNITED STATES PATENT OFFICE.

MELVILLE CLARK, OF CHICAGO, ILLINOIS, ASSIGNOR TO MELVILLE CLARK PIANO COMPANY, A CORPORATION OF ILLINOIS.

DRIVE MECHANISM FOR COMBINED PHONOGRAPHS AND PLAYER-PIANOS.

1,246,053.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed February 21, 1916. Serial No. 79,526.

To all whom it may concern:

Be it known that I, MELVILLE CLARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Drive Mechanism for Combined Phonographs and Player-Pianos, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to combine in a single casing a phonograph mechanism and a player piano mechanism, and to arrange for driving the phonograph from the same motor which drives the take-up roll of the player mechanism. The invention consists in the features and elements of construction contributing to this result and their combinations described and shown in the drawings as indicated by the claims.

In the drawings:—

Figure 1 is a perspective view of a player piano having a phonograph mechanism embodied in its casing in accordance with this invention.

Fig. 2 is a plan sectional view of most of the drive gearing for the take-up roll and the phonograph.

Fig. 3 is a detail elevation of certain portions of the drive gearing shown in Fig. 2.

Fig. 4 is a detail elevation of a gear shifting device.

Fig. 5 is a detail view of a clutch shifting device for the take-up roll.

Fig. 6 is a diagrammatic view of the pneumatic connections between the tracker board and certain pneumatics adapted for automatic control of the two mechanisms.

Fig. 7 is a detail view of a disengageable connection in a tempo-controlling means.

Fig. 8 is a detail elevation of speed-varying means for the rotary table of the phonograph.

Fig. 9 is a detail section showing a manually operable winding gear for the motor.

Fig. 10 is a detail section of a sound-controlling curtain for the phonograph amplifier.

Fig. 11 is a front detail elevation of a spring motor for driving the mechanism associated with this invention.

Fig. 12 is a diagrammatic side elevation of certain gear trains of the motor shown in Fig. 11.

Fig. 13 is a detail of the motor brake.

Fig. 14 is a detail view of the speed-controlling cam for actuating the brake and the reversing train.

It may be understood that this combined phonograph and player piano is designed primarily for rendering vocal or instrumental selections by means of the phonograph with piano accompaniment controlled by the usual form of perforated note sheet, shown at 1, in Fig. 1; the rotary record-carrying table of the phonograph is arranged to be driven at a uniform speed from the same motor shown at 2, as is regularly provided for driving the take-up roll, 3, of the player mechanism. In order, however, that either the player piano or the phonograph may be operated independently when desired, it is necessary to make the driving connections such that either mechanism can be driven alone from the motor, 2.

This motor, 2, may be of any convenient type fitted with a speed-regulating governor and speed-varying means; it is shown in the drawings as a spring motor of substantial construction, and to render its relation to the other parts sufficiently clear it must be described somewhat in detail. Referring to Figs. 11, 12, 13 and 14, it will be noted that the motor is mounted just beyond the casing carrying the take-up roll, 3. Its spring drum, 2^a, is geared to a small pinion, 2^b, on the shaft, 2^c, carrying a gear, 2^d, meshing with a pinion, 2^e, on the shaft, 2^f. From this shaft motion is transmitted through spiral gearing to the so-called fly-ball or centrifugal governor whose mode of operation is well understood and whose friction disk, 2^g, is engaged by a brake, 2^h, whose adjustments serve to control the speed of the motor. The shaft, 2ⁱ, also carries a gear, 2^j, meshing with a gear, 2^k, which is carried on an arm, 2^l, mounted to swing about the axis of the shaft, 2ⁱ, connecting the gear, 2^k, either with the gear, 2^m, on the take-up roll shaft or with the gear, 2ⁿ, for driving the pinion, 2^o, on the rewind shaft. The brake, 2^h, is carried by one arm of a bell crank lever, 2^p, whose other arm engages a cam slot, 2^q, in a slidable control bar, 2^r, whose movement in a direction parallel to the axis of the take-up roll, 3, effects the adjustment of the brake, 2^h, for varying the speed of the motor, 2, and even for holding it at rest. A second cam slot, 2^s, in the bar, 2^r, controls a bell crank, 2^t, connected by a link, 2^u, to the

swinging arm, 2¹, which carries the gear, 2^k, so that after the cam bar, 2^s, has been moved from its zero speed position to its maximum speed position by means of a hand lever, 2^w, a further movement of the lever in the same direction shifts the gear, 2^k, through its neutral position and into mesh with the gear, 2^a, for rewinding the note sheet with the motor running at maximum speed.

Now referring to Fig. 2, the record-carrying table of the phonograph will be found indicated by a dotted circle at, 4, and the spindle of this table is shown in section at 5, carrying a friction pulley or wheel, 6, whose periphery contacts with the face of the friction plate, 7, secured to the end of a shaft, 8, at whose opposite end a spur pinion, 9, mounted near the adjustable journal, 10, of the shaft, 8, stands in position to mesh with the gear, 2^a, on the motor, 2. As above indicated, this gear is normally connected in the train which draws the take-up roll, 3, but since the phonograph table, 4, must be operated at a constant speed to avoid varying the pitch of the music produced, and since it may be necessary from time to time to slightly vary the speed of the take-up roll, 3, for synchronizing the phonograph music with the player accompaniment, it is no longer feasible to drive the take-up roll directly from the motor 2, when both mechanisms are to be operated by said motor, and motion is, therefore, transmitted to the take-up roll, 3, through a pinion, 11, on the shaft, 8, meshing with a gear, 12, whose face, 12^a, constitutes a friction plate in driving engagement with a friction wheel, 13, rotatively carried on a shaft, 14, but slidable longitudinally thereof for varying its position on the face of the gear, 12, and thus varying the speed transmitted. The shaft, 14, carries a bevel gear, 15, meshing with a similar bevel gear, 16, on a horizontal shaft, 17, provided with a disengageable clutch, 18, connecting with the take-up roll, 3. A yoke, 19, engaging the grooved hub of the friction wheel, 13, and carried on a slidably mounted stem, 19^a, is arranged to be shifted through a bell crank, 20, and links, 21, by means of a handle, 22, which is accessible just below the take-up roll in the central open panel of the piano casing.

As to the operation, it may be understood that the governor brake, 2^b, of the motor, 2, is first utilized for varying the speed of the phonograph table, 4, to insure that the phonograph record will be rendered in correct time with the piano. Then by pressing the knob, 23^a, on the rod, 23, the latch member, 24, is depressed to release the lower end of the bell crank, 25, permitting its upper and horizontal arm, 25^a, to swing downwardly and lower the stylus, 26, onto the phonograph record indicated at 27, in Fig. 3.

With the record standing at rest the stylus, 26, is placed approximately at the point at which the actual music begins, and the arm, 25^a, of the bell crank, 25, is then raised to lift the stylus, 26, just off the record, 27, the bell crank, 25, being retained in its position by the latch member, 24, which automatically resumes the engagement illustrated in Fig. 3 under the tension of its spring, 28. A small motor pneumatic, 29, connected to the lower end of the rod, 23, and thereby linked to the latch member, 24, is adapted to release the latch, 24, when collapsed, thus permitting the sound box, 30, and its stylus, 26, to be lowered by gravity onto the record, 27. Fig. 6 illustrates diagrammatically the motor pneumatic, 29, connected with its primary pneumatic, 31, which is connected to a duct, 32, in the tracker board, 33, so that if the perforated note sheet which is to control the playing of the piano accompaniment to the phonograph music be provided with a perforation positioned to uncover the duct, 32, at the proper point in the accompaniment for the beginning of the phonograph music, the note sheet will serve to automatically bring the phonograph into action by thus actuating the motor pneumatic, 29, which releases the latch member, 24, and permits the stylus, 26, to engage the record, 27. After ascertaining the correct speed for proper tuning of the phonograph music and finding the proper initial position for the stylus, 26, the motor, 2, is first started at the ascertained speed and begins to revolve the table, 4, and also the take-up roll, 3, driven through the medium of the friction wheel 13, engaging the face of the gear, 12; the note sheet, 1, being advanced by the rotation of the take-up roll, 3, and having an aperture registering with the duct, 32, then automatically starts the phonograph music, and the operator can almost immediately note whether the accompaniment should go slower or faster to be properly synchronized with the phonograph solo. Such synchronization is easily effected by shifting the friction wheel, 13, by means of the handle 22.

Although the perforated note sheet is especially cut to serve for controlling an accompaniment to a particular phonograph record, being preferably made by the automatic recording of the hand-played accompaniment of a competent artist, the lengthening or shortening of the paper note sheet, due to changes of humidity, may require that occasional adjustment of the speed-controlling handle be made during the rendition of the piece to keep the accompaniment strictly synchronized. In addition to such changes of speed it may be desirable to arrange for temporarily varying the ratio of speed between the note sheet, 1, and 130

the phonograph record, 27, and this may be effected automatically by means of a familiar step-by-step device, shown in detail in my Patent No. 1,013,862, dated Jan. 9, 1912, and indicated in Fig. 3 at 34. This device includes a rack, 35, connected by a link, 36, to the bell crank lever, 20; a gear, 37, meshing with the rack, 35, is arranged to be fed step-by-step in one direction by a motor pneumatic, 38, and similarly in the opposite direction by the pneumatic, 39, said pneumatics being controlled, respectively, by ducts, 40 and 41, as indicated in Fig. 6.

Since the note sheet controlling the accompaniment is especially made to fit the particular phonograph record, 27, there will be a particular point in the note sheet corresponding quite accurately to the last note of the phonograph music, and immediately following this point the note sheet may be perforated at a position to register with a duct, 42, controlling the primary pneumatic, 43, corresponding to a motor pneumatic, 44, which is connected by a link, 45, to the lower end of the bell crank, 25, so that collapse of motor pneumatic, 44, will draw the lever, 25, back into the notch of the latch member, 24, in which position it will be retained, and in moving to which position it will raise the stylus, 26, out of contact with the record disk, 27, and thus throw the phonograph out of action.

Now if it is desired to operate the player piano mechanism without the phonograph, the phonograph mechanism is disconnected from the motor, 2, by slightly springing the shaft, 8, out of line far enough to disengage the teeth of the pinion, 9, from the teeth of the gear, 2^a. This is done by shifting a cam lever, 46, mounted on the side wall, 2^a, of the motor casing to a position in which its notch, 46^a, engages the pin, 47, of the slidably mounted journal bearing, 10, for the shaft, 8, and the notch, 46^a, being at the high point of the cam, it will be evident that this movement serves to separate the pinion, 9, from the gear, 2^a. The notch, 46^a, is only a slight depression in the face of the cam, but sufficient to retain the parts in this adjusted position.

The shaft, 8, being thus thrown out of service, the take-up roll, 3, can no longer be driven through the clutch, 18. The slidable member of the clutch, 18, is connected through a shifter rod, 49, with the slidable member of a clutch, 50, on the shaft of the motor gear, 2^m, so that as the clutch, 18, is disengaged the clutch, 50, serves to couple the shaft directly to the take-up roll, 3, and the movement of the shifter rod, 49, is effected by a slidable cam block, 51, connected directly to the cam lever, 46, as shown in Fig. 4. A follower roller, 52, on the end of the shifter rod, 49, engages the cam face

of the block, 51, as indicated in Fig. 5, and is maintained in such engagement by a spring, 53, conveniently disposed near the opposite end of the rod, 49, to react against the one wall, 53^a, of the tracker housing, 53^b. A link, 54, connected at one end to the cam lever, 46, and carrying at its opposite end a handle, 55, projecting through a slot in the wall, 53^b, of the tracker housing, provides the manually engageable adjusting means for the cam lever, 46, and sliding cam, 51. It will be clear from Figs. 4 and 5 that when the lever, 46, is moved to the middle position of its range, that is, with the pin, 47, engaged in the notch, 46^a, the follower roller, 52, will ride on the highest part, 51^a, of the cam, 51, thus effecting crowding engagement of the clutch, 50.

When the player piano is operated without the phonograph, it may be desired to use upon it such perforated note sheets as are provided for automatic control of the tempo by means of perforations positioned to register with the ducts, 40 and 41. Such perforations would effect actuation of the step-by-step device, 34, as fully described in my said Patent No. 1,013,862 and to render this operative for controlling the tempo there is provided a hook, 56, designed to engage an eye, 57, for connecting the link, 21, directly to the motor governor whose controlling lever is rigidly associated with the movable tempo index, 58, on which the eye, 57, is secured. This detail is shown in Fig. 7, though the connection between the index, 58, and the governing devices of the motor, 2, are illustrated in detail in Figs. 11, 12, 13 and 14. But since the movement of the link, 21, necessarily involves movement of the bell crank, 20, and with it a shifting of the friction wheel, 13, across the face, 12^a, of the gear, 12, it is desirable to separate the frictionally engaged surfaces of the wheel, 13, and gear, 12, and this is automatically effected by a cam roller, 59, carried by the cam lever, 46, in position to encounter one end of a tubular thrust link, 60, slidably mounted on the shaft, 8, and connected by a lever, 61, with a push rod, 62, arranged to act against the center of the face of the gear, 12, to push said gear axially out of engagement with the friction wheel, 13, by slightly compressing its follower spring, 63. Since the push rod, 62, only comes into play when the shaft is disconnected from the motor, 2, the gear, 12, stands idle and is in no way embarrassed by the action of the push rod, 62, and the friction wheel, 13, is left free for sliding movement following the movement of the link 21.

When it is desired to operate the phonograph alone and independently of the piano, the handle, 55, is moved through the entire range bringing the pin, 47, into engagement with the notch, 46^a, of the cam lever, 46. This permits the gear, 9, to move back into

mesh with the gear, 2^d, for operatively connecting the motor, 2, with the phonograph table, 4. Simultaneously the cam member, 51, is shifted to bring its surface, 51¹, into contact with the follower roller, 52, on the shifter rod, 49, and since this surface, 51¹, is in a plane intermediate the planes of the surfaces, 51^a and 51^b, respectively, it puts the shifter, 49, into a position in which both the clutches, 18 and 50, are disengaged from the take-up roll, 3, so that the motor, 2, causes no movement of the take-up roll, 3. From this position of the cam lever, 46, the cam roller, 59, is carried below the shaft, 8, and beyond the end of the tube, 60, thereon allowing the latter to stand in its normal position with the thrust rod, 62, exerting no pressure on the face of the gear, 12.

When the motor, 2, is a spring motor it is normally kept wound by automatic winding devices, not shown, and connected with the pumping mechanism of the player piano, but when the phonograph is used for any considerable length of time without the player mechanism of the piano the spring motor will of course run down and must be rewound. Since the winding shaft, 64, extends to the end of the piano casing at 65, for convenient connection of the winding clutches, 66, with the pumping mechanism in the lower part of the piano case, it is a simple matter to provide reduction gears, 67, 68 and 69, connecting the winding shaft, 64, with a short shaft, 70, and a removable winding crank, 71, just outside the end panel, 65, of the piano case.

As indicated in Fig. 3, the sound box, 30, of the phonograph connects through its tone arm, 72, with an amplifier, 73, opening directly into the back of the frame which carries the take-up roll and note sheet spool. The sound-discharging opening, 74, is arranged to be varied as to its size for controlling the volume of sound discharged therefrom by provision of a curtain, 75, shown mounted on a roller, 76, and carrying in its free end a weighted rod, 77, whose ends are guided in guideways, 78, while the roller, 76, is arranged to be rotated through a train of gears indicated on Fig. 3 at 79, and manually operable through a knurled knob, 80, conveniently located near the front of the frame and in the opening into which the note sheet spool is to be mounted.

I claim:—

1. In combination with a piano player action and note-sheet-carrying and propelling means, comprising take-up and re-wind rolls, a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor; driving connections by which said shaft drives the

take-up roll and speed-varying devices in said connections.

2. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor; driving connections by which said shaft drives the take-up roll; speed-varying devices in said connections, and manually operable means for operating said devices.

3. In combination with a piano player action and note-sheet and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor; driving connections from said shaft to the take-up roll; speed-varying devices in said connections, and note-sheet-controlled means for operating said devices.

4. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls; a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor; driving connections from said shaft to the take-up roll, and speed-varying devices in said connections; a disengageable clutch in said connections; another clutch for directly connecting the take-up roll with the motor, and means for shifting said clutches simultaneously to connect the take-up roll with one or the other of said driving means.

5. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls; a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor independently of the take-up roll or its shaft; said connections for the record carrier comprising speed-varying devices, and manually-operable means for adjusting said devices.

6. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls; a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with

the motor and with the record carrier for actuating the carrier by the motor independently of the take up roll or its shaft; said connections with the record carrier comprising a friction disk on said shaft, a spindle for the carrier parallel with the face of said disk, a friction pulley on the spindle engaging with face of the disk and slidable on the spindle, and manually-operable means for sliding the pulley along the spindle.

7. In combination with a piano player action, note-sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier and means by which it is rotated in determined time-relation with the take-up roll; a reproducer comprising a stylus-holder mounted for co-operation with the record; means for lifting the stylus-holder to carry the stylus away from the record, and note-sheet-controlled means for so lifting it.

8. In combination with a piano player action, note-sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier and means by which it is rotated in determined time-relation with the take-up roll; a reproducer comprising a stylus holder mounted for coöperation with the record; means for lowering and lifting the holder to carry the stylus to and from the record, and note-sheet-controlled means for controlling the lowering and lifting of the holder.

9. In combination with a piano player action, note sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier and means by which it is rotated in determined time-relation with the take-up roll; a reproducer comprising a stylus-holder mounted for co-operation with the record; an arm extending over the record carrier for lodgment of the stylus carrier thereon; means for raising and lowering said arm to lift the stylus carrier from the record and lower it into contact therewith, and note-sheet-controlled means for so operating said arm.

10. In combination with a piano player action, a note sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier, a train of gearing by which both the phonograph record-carrier and the take-up roll are rotated in determined time relation with each other; a reproducer comprising a stylus-holder; a tone arm on which the reproducer is carried for coöperation with the record; said tone arm being pivoted for swinging freely over the record, and adapted to be fed thereover solely by the engagement of the stylus with the record; a bar extending over the record carrier for lodgment of the stylus carrier thereon; means for raising and lowering said bar to lift the stylus' carrier from the record and lower it into contact therewith;

means for latching the bar in its elevated position for holding the stylus out of co-operation with the record; and manually-operable means for releasing the latch.

11. In combination with a piano player action, a note-sheet and note-sheet-carrying and propelling means comprising a take-up roll, a phonograph record carrier, and means by which it is rotated in determined time-relation with the take-up roll; a reproducer comprising a stylus-holder mounted for co-operation with the record; a bar extending over the record carrier positioned for affording lodgment of the stylus-holder thereon; a pneumatic operatively connected with said bar for controlling the lifting and lowering thereof, and note-sheet-controlled means for energizing said pneumatic.

12. In combination with a piano player action, a note-sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier and means by which it is rotated in determined time-relation with the take-up roll; a reproducer comprising a stylus-holder mounted for co-operation with the record; a bar extending over the record carrier positioned for affording lodgment of the stylus-holder thereon; a latch for holding the bar at elevated position; a pneumatic operatively connected with the latch for disengaging it; and note-sheet-controlled means for energizing said pneumatic.

13. In combination with a piano player action, a note-sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier and means by which it is rotated in determined time relation with the take-up roll; a reproducer comprising a stylus-holder mounted for co-operation with the record; a bar extending over the record carrier positioned for affording lodgment of the stylus-holder to hold the stylus out of contact with the record or lower it thereto; a latch for holding the bar at elevated position; a spring for yieldingly holding said latch engaged with the bar; a pneumatic operatively connected with the latch for disengaging it in opposition to said spring, and note-sheet-controlled means for energizing said pneumatic.

14. In combination with a piano player action, note-sheet and note-sheet-carrying and propelling means comprising a take-up roll; a phonograph record carrier; a train of gearing by which both the phonograph record-carrier and the take-up roll are rotated in determined time relation with each other; a reproducer comprising a stylus-holder; a tone arm on which the reproducer is carried for coöperation with the record; said tone arm being pivoted for swinging freely over the record and adapted to be fed thereover solely by the engagement of the stylus with the record; a bar extending over the record

carrier positioned for affording lodgment for the stylus-holder, said bar being manually operable for lifting it to take the stylus-holder out of contact with the record, a spring-operated latch for engaging the bar to hold it in said lifted position, and manually-operable means for releasing the latch.

15. In combination with a piano player action, and note-sheet-carrying and propelling means comprising take-up and re-wind rolls; a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor independently of the take-up and rewind rolls or their shafts; driving connections from said motor-connected shaft to the take-up roll comprising a friction disk which derives rotation from said shaft; a counter shaft parallel to the face of said disk; a friction pulley mounted for sliding on the last mentioned shaft and carried peripherally along the face of the disk toward and from the axis thereof, a shifting device connected with said pulley for so sliding it along its shaft; manually operable means for operating said shifting device.

16. In combination with a piano player action, note-sheet and note-sheet-carrying and propelling means comprising take-up and re-wind rolls; a motor for actuating the re-wind roll; a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft operatively connected with the motor and with the record carrier for actuating the carrier by the motor; driving connections from said shaft to the take-up roll comprising a disk which is rotated in connection with said shaft, a second shaft extending parallel to the face of said disk, a friction pulley mounted for sliding on said second shaft with its periphery in contact with said disk, a shifter connected to said pulley for so sliding it, and note-sheet-controlled means for operating said shifter.

17. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a motor gear train for actuating the re-wind roll, a phonograph record carrier mounted in juxtaposition to the note-sheet-carrying means; a shaft which is not concerned in the actuation of said rolls operatively connected disengageably with the motor and independently of the roll-operating shaft of said train, and also operatively connected with the phonograph record carrier for actuating said carrier by the motor, and means for engaging and disengaging said shaft and the motor at will.

18. In combination with a piano player

action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a speed-governed note-sheet motor; a phonograph record carrier; a shaft operatively connected with the motor and with the carrier for actuation of the carrier by the motor independently of the take-up and rewind rolls or their shafts, the second mentioned connection comprising speed-varying devices, and means for adjusting said devices.

19. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a speed-governed note-sheet motor; a phonograph record carrier; a shaft operatively connected at one end with the motor and at the other end with the carrier for actuating the carrier by the motor independently of the take-up and rewind rolls or their shafts; means for actuating the take-up roll directly from the note-sheet motor; means for actuating said roll from said shaft, each of said means comprising a shiftable clutch; means connecting said clutches for their simultaneous operation to carry one into and the other out of engaging position; a bearing support for said first-mentioned shaft near its motor-connected end, mounted movably on the motor frame; means for moving said shaft operatively connected with the means for operating said clutches, adapted for disengaging said shaft from the motor when the clutches are moved for connecting the take-up roll shaft with the motor.

20. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a note-sheet motor; a phonographic record carrier; a shaft operatively connected at one end with the motor and at the other end with the carrier for actuating the carrier by the motor; means for actuating the take-up roll directly from the note-sheet motor and means for actuating said roll from said first mentioned shaft, each of said means comprising a shiftable clutch, said clutches being connected for simultaneous shifting movements; a bearing support for the first mentioned shaft near its motor-connected end, mounted movably on the motor frame; cams for actuating said bearings and the clutch-shifting device respectively, and a cam-operating member connected to both said cams for their simultaneous operation for disconnecting said shaft from the motor when the take-up roll shaft is connected with the motor.

21. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a note-sheet motor, a phonographic record carrier; a shaft operatively connected with the motor and with the carrier for actuating the carrier by the motor; means

for actuating the take-up roll directly from the note-sheet motor; means for actuating said roll from said first mentioned shaft, each of said means comprising a shiftable
 5 clutch, a bar by which both of said clutches are carried for simultaneous movement to engage one and disengage the other, a spring acting upon said bar to hold the direct driving clutch disengaged; a bearing support
 10 for said first-mentioned shaft near the motor-connected end mounted movably for springing said shaft to carry it out of engagement with the motor; a lever fulcrumed on the motor frame and two cam devices car-
 15 ried by said lever, one operating upon said clutch-carrying bar, and the other upon the shaft bearing for actuating said bar and bearing against the yielding resistance of said spring and said shaft.

20 22. In combination with a piano player action and note-sheet-carrying and propelling means comprising take-up and re-wind rolls, a note sheet motor, a phonographic record carrier; a shaft operatively connect-
 25 ed with the motor and with the carrier for actuating the carrier by the motor; means for actuating the take-up roll directly from the note-sheet motor; means for actuating said roll from said first mentioned shaft,
 30 each of said means comprising a shiftable clutch, a bar by which both of said clutches are carried for simultaneous movement to engage one and disengage the other, a spring acting upon said bar to hold the direct driv-
 35 ing clutch disengaged; a bearing support for said first-mentioned shaft near the motor connected end mounted movably for springing said shaft to carry it out of engagement with the motor; a lever fulcrumed

on the motor frame and two cam devices 40 carried by said lever, one operating upon said clutch-carrying bar, and the other upon the shaft bearing for actuating said bar and bearing against the yielding resistance of said spring and said shaft, the
 45 cam for operating said shaft bearing having two low points at each of which said shaft is engaged with the motor, the other cam having its lowest point corresponding with one of the low points of the first mentioned
 50 cam, and a second point of intermediate elevation corresponding to the other of said low points, and adapted for holding said clutches at intermediate position at which
 55 both are disengaged when said shaft is engaged with the motor.

23. In combination with a piano case, a player action and a spring motor for the note-sheet propelling devices thereof mount-
 60 ed within the case; a phonograph record carrier and connections from said motor for actuating said carrier, the motor having dis-engageable driving connections to the note-sheet-propelling devices, whereby the motor
 65 may actuate the phonograph record carrier without actuating said note-sheet-propelling devices; a winder for the motor mounted within the piano case at one end thereof;
 70 and a shaft from said winder to the motor for winding the latter, said winder having a shaft which is accessible from the outside of the piano case for operating it to wind the motor.

In testimony whereof I have hereunto set my hand at Chicago, Illinois, this 3rd day
 75 of February, 1916.

MELVILLE CLARK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

The first part of the paper is devoted to a general discussion of the problem of the origin of life. It is shown that the problem is one of the most important and most difficult in the history of science. The second part of the paper is devoted to a discussion of the various theories of the origin of life. It is shown that the most plausible theory is that of spontaneous generation. The third part of the paper is devoted to a discussion of the evidence in favor of spontaneous generation. It is shown that the evidence is very strong and that it is not possible to explain the origin of life in any other way. The fourth part of the paper is devoted to a discussion of the implications of the theory of spontaneous generation. It is shown that the theory has important implications for the study of the history of life on earth. The fifth part of the paper is devoted to a discussion of the future of the study of the origin of life. It is shown that the study of the origin of life is one of the most important and most difficult in the history of science and that it is likely to remain so for many years to come.

MUSICAL INSTRUMENT.

1,248,035 ----- R. Colling.
Patented Nov. 13, 1917,
Filed Dec. 27, 1916.

1,246,055.

R. COLLING.
MUSICAL INSTRUMENT.
APPLICATION FILED DEC. 27, 1916.

Patented Nov. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1

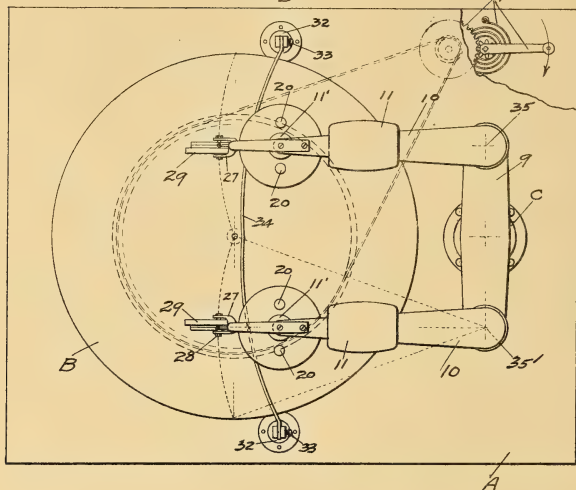
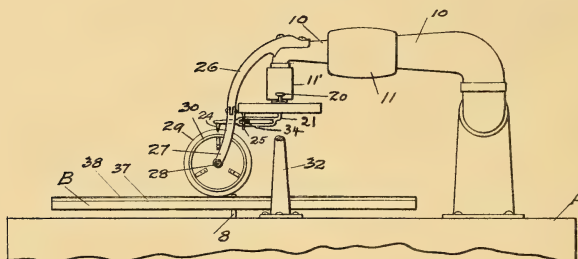


Fig. 2.



Witnesses:

R. Colling
R. Colling

Ralph Colling

By *R. Wright*

Inventor.

Att'y.

1,246,055.

Patented Nov. 13, 1917.
2 SHEETS—SHEET 2.

Fig. 6

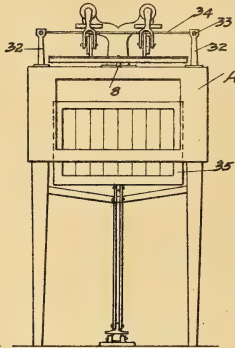


Fig. 7

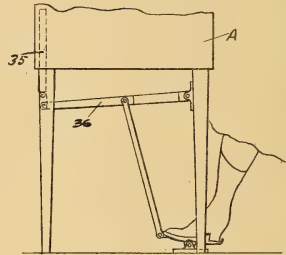


Fig. 3.

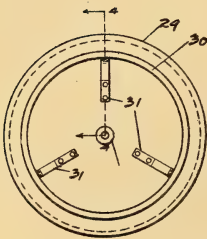


Fig. 4.

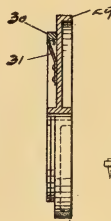
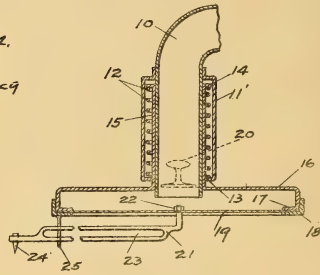


Fig. 5.



Witnesses:

J. Collins
R. B. Smith

Ralph Colling.
By *R. E. Wright*

Inventor,

Atty.

UNITED STATES PATENT OFFICE.

RALPH COLLING, OF BENTON COUNTY, OREGON.

MUSICAL INSTRUMENT.

1,246,055.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed December 27, 1916. Serial No. 139,069.

To all whom it may concern:

Be it known that I, RALPH COLLING, a citizen of the United States, residing in Benton county, State of Oregon, have invented a new and useful Improvement in Musical Instruments, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to that class of devices wherein tones are mechanically produced from or in connection with tone records and a vibrating diaphragm.

The object of my invention is to provide a device by means of which melodies may be produced from the record of a single standard tone of the human voice, or of an instrument, and which melodies shall be of artistic tone quality and greater precision as a whole than when produced in the ordinary way as a melody; also to produce a pure legato or glide between different pitches of tones recorded from instruments whose nature does not permit such glide to be produced from them. I attain these objects, as well as other advantages, by the construction, combination and arrangement of parts illustrated in the accompanying drawings which form a part hereof.

Figure 1 is a plan view of the device.

Fig. 2 is a side elevation of an upper part thereof.

Fig. 3 is a side elevation of the disk and record.

Fig. 4 is a sectional view of same on the line 4—4 of Fig. 3.

Fig. 5 is a sectional view of part of the tone arm and diaphragm and side view of the slotted needle bar below.

Fig. 6 is an end view of the device with cabinet appertaining to it.

Fig. 7 is a side view of lower part of cabinet illustrating operation of shutter pedal lever.

Like letters and numerals refer to like parts in all views.

A is a cabinet provided with legs.

B is a circular turn table which is rigidly secured at its center upon the upper end of a rotatable shaft 8.

C is a vertical tube or horn standard which extends from within the cabinet A to a suitable height above the cabinet. The horn C is provided with a rigid horizontal cross-tube 9 and said horn opens into the center of the tube 9. At the ends of the tube 9 are horizontal tone arms 10. The lat-

ter arms are pivotally mounted at their ends within the ends of the tube 9. The tone arms 10 are also provided with hand grips 11. 60

The arms 10 extend over the turn table B, and the end portions thereof extend vertically downward. About the lower ends of the outer ends of the tone arms 10 are casings 11' rigidly secured. Within the casings are coil springs 12, Fig. 5. The lower ends of the springs engage lower interior shoulders 13 of the casings 11' and the upper ends of the springs 12 engage the upper ends 14 of the telescoping stem 15 of the diaphragm holder 16. The holder 16 has a vertical stem 15 extending into the casings 11'. The holder has a circular horizontal frame at the lower end of its stem which frame has a lower shoulder 17. The holder is also provided at its lower end with a circular screw cap 18 which engages the shoulders 17. A diaphragm 19 is secured horizontally between the shoulders 17 and cap 18. The holder 16 has two finger buttons 20 on its upper surface. A horizontal record needle bar 21 is secured to the center of the diaphragm by the nut 22. The needle bar has a longitudinal slot 23 and a vertical jeweled needle point 24 in its free end. Vertical guide pins 25 are provided in the lower surface of the holder 16 to guide the movement of the bar 21 vertically and prevent its lateral movement. 75

The upper ends of disk arms 26 are rigidly secured on the ends of the tone arms 10. The arms 26 have forks 27 in their lower ends. Horizontal shafts 28 are placed in the lower ends of the forks and have means to secure them rigidly. Rotatable disks 29 are mounted on the shafts 28. Circular tone records 30 are mounted concentrically upon the faces of the disks by means of holding springs 31. The records 30 are of smaller diameter than the disks 29. The springs are so arranged that the records may be quickly removed and others substituted. 90

At each side of the turn table B, rigidly secured on the case A, is a vertical standard 32 provided with a set screw 33. Extending from one standard to the other and above the turn table B is a fulcrum rod 34. It is rigidly secured at its respective ends by the screws 33. It also passes through each of the slots 23 of the needle bars 21. The rod 34 is constructed so that each half thereof forms an arc of a circle from its respective 105 110

standard end toward the center of the rod. A shutter 35 is arranged in the cabinet A. The shutter is provided with a pedal lever 36. The turn table B is provided with a rubber mat or cover 37 rigidly secured on its upper surface and upon the cover is a mat or facing 38 rigidly secured. The latter is preferably of celluloid. The rubber is to obviate vibrations in the disk and the celluloid is to provide a hard, smooth and even surface upon which the disk shall travel. Means 39 are illustrated, by which the turn table B may be rotated for a length of time and speed as may be pre-determined. Any suitable means, for example such as are employed in phonographs, may be used to rotate the turn table B. The axis 35' of each tone arm 10 and the arrangement of the disk thereon, are such that the arc of travel of the engaging tread of the disks 29 upon the table B shall be from the center of the latter to its rim as illustrated. The fulcrum rod 34 is so arranged that when the record needle 24 is over its midpoint of travel between the center and rim of the table B, as shown, the distance from the point of travel of the needle to the rod 34 is one-half the distance between the needle and the center of the diaphragm 19. Upon moving the needle to its outermost point of travel toward the rim of the table B the distance between the point of travel of the needle and the rod 34 is two-thirds the distance between the needle and center of diaphragm. A related ratio of such distances obtains at any point of travel where the needle may be.

The disks are arranged to engage the table B only sufficiently to cause them to rotate. The tone records are intended to carry the same uniform, continuous tone of the human voice or of an instrument. The records may carry different tones of like character. Records may be substituted to produce any desired standard tone as desired.

It will be observed that the operation of the device consists in first starting the rotating means 39 which rotates the turn table B. This causes the disks 29 to rotate and the single, standard tone described is produced from each record through the needle and diaphragm into a receiving tone arm 10 and thence transmitted to the mouth of the horn C whence it issues within the cabinet in a similar manner as with a phonograph. The handles 11 are grasped by the operator and the disks are moved along their lateral path of travel. The fingers are placed upon the buttons to evenly depress or release the diaphragm holder 16. That is, when depressed, the needle is raised and sound ceases. When released the spring 12 causes renewed engagement of the needle with the record. The fulcrum of the arm on the rod varies in relation to the position of the needle in its lateral path of travel with respect to the

distance from said position to the fulcrum rod 34. The tone record is one of a fixed number of vibrations. When a disk is moved laterally it is obvious that a varying speed is produced in it by the turn table, according to the position of the concentric circle upon the table to a point in which circle the disk is moved. Any variation in the speed of the disk will produce from its tone record, corresponding variations in the number of vibrations transferred from record to diaphragm; that is to say variations in tone pitch will be delivered through the horn outlet. Now, by moving the disks laterally from point to point a melody is produced if the points are in proper relation to each other. If the same fulcrum of the needle bar on the fulcrum rod was preserved while the disks were laterally moved and throughout the variations of pitch, there would not follow a corresponding inverse variation of amplitude to equalize the tone volume. To secure an unvarying volume throughout a varying pitch, the fulcrum rods are arranged at distances from the path of travel as described. This arrangement will cause the needle bar to vary the amplitude of vibrations transmitted to the diaphragm in inverse ratio to their frequency. The principle thus embodied in the device is consonant with the known laws of acoustics. It will be observed that if a disk is moved laterally from its illustrated mid position of travel to the rim of the table B the speed of the disk and its record will be doubled, but the amplitude of the vibrations received by the diaphragm will vary inversely, that is, they will be one-half. The ratio of amplitude of the vibrations in the diaphragm and the same vibrations in the needle point in the mid position are as 1 to 1 but in the outer position referred to they are as 1 to 2. By proper calculation the ratio of vibrations occurring when the needle bar has any given fulcrum on the rod 34 may be determined in a like manner. The shutter 35 is provided to regulate the volume of tone to be emitted from within the cabinet outwardly. The shutter is operated by pedal lever means as shown. It is to accomplish the foregoing results that the fulcrum rod 34 is arranged in a pre-determined position with relation to the lateral path of travel of the needle. The springs 12 cause the needle point to engage the record groove with a pre-determined pressure. It is apparent that the spring 12 draws the diaphragm holder 16 upward and this in turn draws the secured end of the bar 21 upward, which latter, having its fulcrum on the rod 34 causes a downward movement of the needle at the opposite end and into engagement with the record in its groove.

I contend that when my device is skillfully operated, tones, harmonies and melo-

dies can be produced from the standard, unit tones of the records, with greater ease than from the original instrument, for example, from whose tone the record was made. I contend that I have devised a method comparable to a violin string which is tuned to a single key tone, but without the difficulties met with in retaining the string at a given pitch. The device will also enable an operator to produce glide tones from records of standard tones taken from instruments the nature of which prohibits the production of such tones from the originals.

I claim—

1. In a device of the character described, the combination of a horizontally arranged diaphragm, a needle bar rigidly secured at one end below the diaphragm in and to the center thereof, a vertical needle extending downwardly from the free end of said bar, a vertically rotatable circular tone record having a continuous groove in its circumferential edge in which a standard, unit tone is registered for reproduction, means to secure said record below the needle in a position to allow the latter to continuously engage the former while rotating, and means to suspend the diaphragm in a position to retain the needle in uniform engagement with the record, substantially as described.

2. In a device of the character described, the combination of a horizontally arranged holder, a horizontal diaphragm rigidly secured therein, a needle bar having a longitudinal slot therein rigidly secured at one end below the diaphragm in and to the center thereof, said bar extending outwardly and being provided with a vertical needle in its free end, a vertically rotatable circular tone record having a continuous groove in its circumferential edge in which a standard, unit, continuous tone is registered for reproduction, means to secure said record below said needle in a position where the latter can engage the record in its groove as the former is rotated, means to suspend the diaphragm holder in a position to retain the needle in uniform engagement with the record in a pre-determined manner, means to move the needle and the record laterally in a circular path of travel, a fulcrum rod rigidly secured in the rear of the needle at a pre-determined distance in all its parts from the lateral arc of travel of the needle said rod extending through the slot of said needle bar, substantially as described.

3. In a device of the character described, a rotatable horizontal turn table B having a central supporting shaft, a horn secured in a rigid position, a lateral horizontal tube the center of which opens into said horn, horizontal tone arms pivoted at one end in the ends of said lateral tube said tone arms extending over the table and terminating

in vertical ends, a horizontally arranged holder retained upon and in suspension from each vertical tone arm end, a horizontal diaphragm rigidly secured in the holder, a needle bar having a longitudinal slot therein rigidly secured at one end below the diaphragm in and to the center thereof, said bar extending outwardly and being provided with a vertical needle in its free end, a vertically rotatable disk having means to retain it to the tone arm in a position wherein the disk may be engaged by the table, a vertical circular tone record having a continuous groove in its circumferential edge in which a standard, unit, continuous tone is registered for reproduction, means to secure said record upon one side of the disk below the needle in a position where the latter can engage the record groove as the former is rotated, means about the tone arm end to suspend the diaphragm holder in a position to retain the needle in uniform engagement with the record in a pre-determined manner, a fulcrum rod rigidly secured in the rear of the needle at a predetermined distance in all its parts from the lateral arc of travel of the needle said rod extending through the slot of the needle bar, substantially as described.

4. In a device of the character described, a rotatable horizontal turn table B having a central supporting shaft, a rubber mat rigidly secured upon the upper surface of the turn table, a celluloid mat rigidly secured upon the upper surface of said rubber mat, a horn secured in a rigid position, a lateral horizontal tube the center of which opens into said horn, horizontal tone arms pivoted at one end in the ends of said lateral tube said tone arms extending over the table and terminating in vertical ends, a horizontally arranged holder retained upon and in suspension from each vertical tone arm end, a horizontal diaphragm rigidly secured in the holder, a needle bar having a longitudinal slot therein rigidly secured at one end below the diaphragm in and to the center thereof, said bar extending outwardly and being provided with a vertical needle in its free end, a vertically rotatable disk having means to retain it to the tone arm in a position wherein the disk may be engaged by the table, a vertical circular tone record having a continuous groove in its circumferential edge in which a standard, unit, continuous tone is registered for reproduction, means to secure said record upon one side of the disk below the needle in a position where the latter can engage the record groove as the former is rotated, means about the tone arm end to suspend the diaphragm holder in a position to retain the needle in uniform engagement with the record in a pre-determined manner, a fulcrum rod rigidly secured in the rear of the needle at a pre-determined distance in all its parts from the

lateral arc of travel of the needle said rod extending through the slot of the needle bar, substantially as described.

5 In a device of the character described, a rotatable horizontal turn table B having a central supporting shaft, a horn secured in a rigid position, a lateral horizontal tube the center of which opens into said horn, horizontal tone arms pivoted at one end in
10 the ends of said lateral tube said tone arms extending over the table and terminating in vertical ends, a horizontally arranged holder retained upon and in suspension from each vertical tone arm end, a horizontal diaphragm rigidly secured in the holder, a needle bar having a longitudinal slot therein rigidly secured at one end below the diaphragm in and to the center thereof, said bar extending outwardly and being pro-
15 vided with a vertical needle in its free end, a vertically rotatable disk having means to retain it to the tone arm in a position wherein the disk may be engaged by the table, a vertical circular tone record having a continuous groove in its circumferential edge in which a standard, unit, continuous tone is registered for reproduction, means to secure
20 said record upon one side of the disk below the needle in a position where the latter can engage the record groove as the former is rotated, means about the tone arm end to suspend the diaphragm holder in a position to retain the needle in uniform engagement with the record in a pre-determined
25 manner, a fulcrum rod rigidly secured in the rear of the needle at a predetermined distance in all its parts from the lateral arc of travel of the needle said rod extending through the slot of the needle bar, means to
30 transmit rotating power to the shaft of the turn table B, substantially as described.

6. In a device of the character described, a rotatable horizontal turn table B having a central supporting shaft, a horn secured

in a rigid position, a lateral horizontal tube the center of which opens into said horn, horizontal tone arms pivoted at one end in the ends of said lateral tube said tone arms extending over the table and terminating in vertical ends, a horizontally arranged holder retained upon and in suspension from each vertical tone arm end, a horizontal diaphragm rigidly secured in the holder, a needle bar having a longitudinal slot therein rigidly secured at one end below the diaphragm in and to the center thereof, said bar extending outwardly and being provided with a vertical needle in its free end, a vertically rotatable disk having means to retain it to the tone arm in a position wherein the disk may be engaged by the table, a vertical circular tone record having a continuous groove in its circumferential edge in which a standard, unit, continuous tone is registered for reproduction, means to secure
55 said record upon one side of the disk below the needle in a position where the latter can engage the record groove as the former is rotated, means about the tone arm end to suspend the diaphragm holder in a position to retain the needle in uniform engagement with the record in a pre-determined manner, a fulcrum rod rigidly secured in the rear of the needle at a pre-determined distance in all its parts from the lateral arc of travel of the needle said rod extending through the slot of the needle bar, means to transmit rotating power to the shaft of the turn table B, a cabinet in and upon which the foregoing mechanism is placed said cabinet having an inclosure into which the horn extends, a shutter in said cabinet, means to open and close said shutter, substantially as described.

RALPH COLLING.

Witnesses:

FRANCES McCOURT,
M. V. WEATHERFORD.

SPRING FASTENER FOR PHONOGRAPHS.

1,246,382 ----- H. Benson.

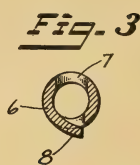
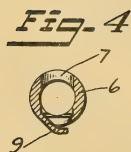
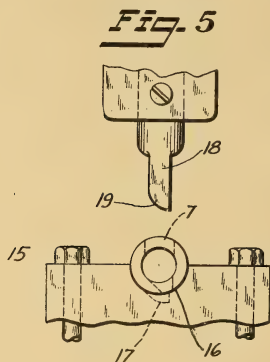
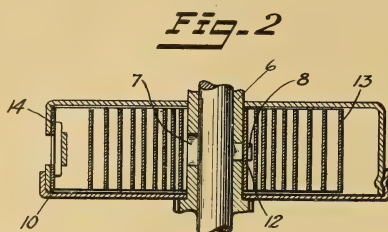
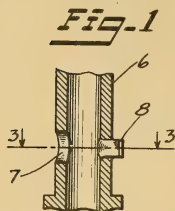
Patented Nov. 13, 1917.

Filed May 21, 1917.

H. BENSON.
 SPRING FASTENER FOR PHONOGRAPHS.
 APPLICATION FILED MAY 21, 1917.

1,246,382.

Patented Nov. 13, 1917.



Inventor
 Helmer Benson.
 By his Attorney
 Wm H. Reid.

UNITED STATES PATENT OFFICE.

HELMER BENSON, OF BLOOMFIELD, NEW JERSEY, ASSIGNOR TO DE CAMP AND SLOAN, INC., A CORPORATION OF NEW JERSEY.

SPRING-FASTENER FOR PHONOGRAPHS.

1,246,382.

Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed May 21, 1917. Serial No. 169,998.

To all whom it may concern:

Be it known that I, HELMER BENSON, a subject of the King of Sweden, and resident of Bloomfield, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Spring-Fasteners for Phonographs, of which the following is a specification.

This invention relates to means formed on sleeves for securing thereto the inner ends of flat evolute springs that are suitably apertured therefor.

The object of the invention is to provide a fastening means of this character that can be readily formed by merely making an opening in the sleeve on one side, and then engaging the opposite wall of the sleeve by a punch and die, to force the metal of the sleeve outwardly and provide a kind of hook shaped lug; that will engage the inner apertured end of a band spring by merely sliding the spring on the sleeve and turning it until the hook engages the apertured end.

In the accompanying drawing illustrating one embodiment of my invention and means for forming it, Figure 1 is a longitudinal section through the sleeve. Fig. 2 is a longitudinal section through the spring barrel with the spring in place. Fig. 3 is a cross-section on the line 3—3 of Fig. 1. Fig. 4 is a similar view with the lug after being machined to reduce its thickness; and Fig. 5 shows means for forming the lug.

As shown in the drawing the sleeve 6 has a comparatively thick wall and on one side I provide an opening 7. Opposite this opening the metal of the sleeve is forced outwardly to provide a lug or hook 8, as shown in Figs. 1 and 3. This lug extends somewhat tangentially as shown, and may be somewhat reduced by machining to produce the hook shaped lug 9 shown in Fig. 4. It will be understood from Fig. 2 that upon insertion of this sleeve 6 in the spring casing 10, it can be readily caused to engage the inner apertured end 12 of the evolute spring 13, whose outer end is shown as secured at 14 to the casing.

In Fig. 5 is shown one form of means for producing this lug. A die 15 is provided having a cylindrical cavity 16 corresponding with that of the sleeve 8, and a socket 17 is

formed in the bottom of this cavity to receive the lug. A punch 18 is suitably mounted to be brought down through the opening 7 in the sleeve, and is formed in section of proper rectangular shape, that its rounded end 19 when caused to engage the bore of the sleeve opposite the opening 7 will force the metal of the sleeve downwardly into the cavity of the die, whereby the lug 8 will be formed, as indicated in Fig. 3. As stated this lug may be machined or reduced on its inner and outer face to reduce its thickness, and provide the lug 9 as shown in Fig. 4.

It will thus be seen that a lug of this character is very easily formed by merely providing an opening or drilling a circular hole in the sleeve of slightly less diameter than the bore of the sleeve, then supporting the sleeve opposite the opening by the die, and then forcing the punch down through the said opening into the sleeve that will engage the wall of the bore and force the metal down into the cavity in the die, whereby the lug is formed. Slight reducing of the lug may be desirable but the lug could be used in its condition as made by the punch and die. Thus a lug of this character is very easily and cheaply constructed and will have sufficient rigidity to receive and hold the evolute spring at its apertured inner end.

Having thus described my invention, what I claim is:—

1. A sleeve fastening lug for coil spring connection consisting of a small sleeve having a comparatively thick wall, and having an opening in one side with the other side pressed outward to provide a hook shaped lug extending tangentially on the periphery of the sleeve adapted to engage the apertured inner end of a band coil spring.

2. The method of forming a peripheral hook lug on a thick walled sleeve, consisting in making a comparatively large opening in the sleeve wall in one side, supporting the opposite side by a recessed die, and inserting a punch through said opening to engage the bore opposite said die, and then forcing the punch toward the die to displace the sleeve metal down into the die socket to form a hook lug that will project tangentially from the periphery of the sleeve.

HELMER BENSON.

MOTOR FOR PHONOGRAPHS.

1,246,401 ----- J. H. Dooley.

Patented Nov. 13, 1917.

Filed Jan. 3, 1917.

J. H. DOOLEY.
MOTOR FOR PHONOGRAPHS.
APPLICATION FILED JAN. 3, 1917.

1,246,401.

Patented Nov. 13, 1917.
2 SHEETS—SHEET 1.

Fig. 1.

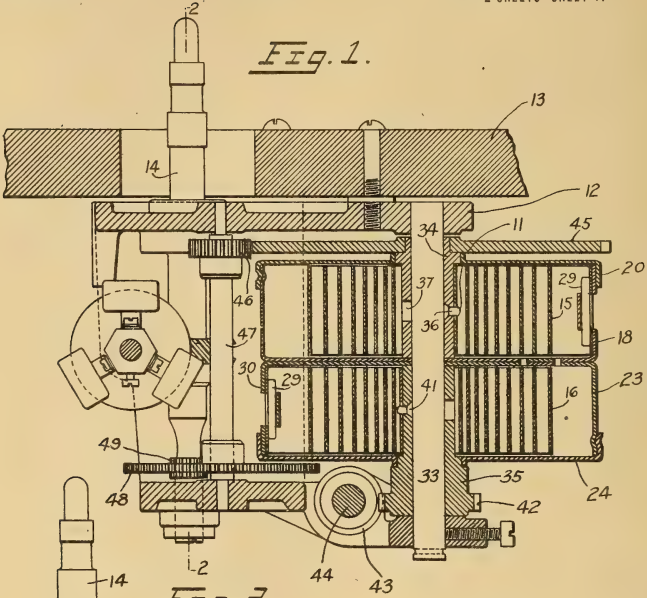


Fig. 2.

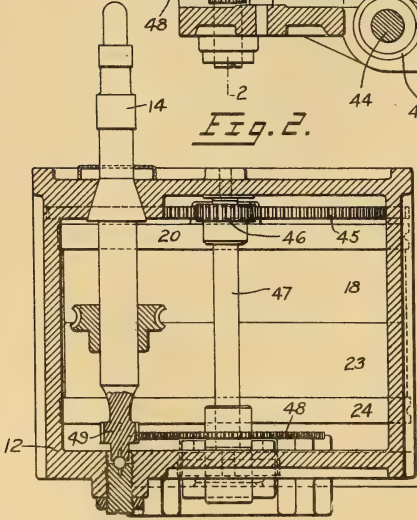


Fig. 10.

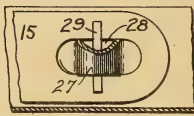


Fig. 11.



INVENTOR:

J. H. Dooley.

By his Attorney, William H. Reid.

J. H. DOOLEY,
MOTOR FOR PHONOGRAPHS.
APPLICATION FILED JAN. 3, 1917.

1,246,401.

Patented Nov. 13, 1917.
2 SHEETS—SHEET 2.

Fig. 3.

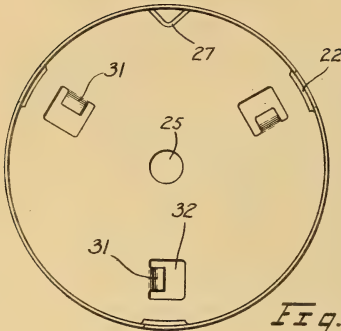


Fig. 4.

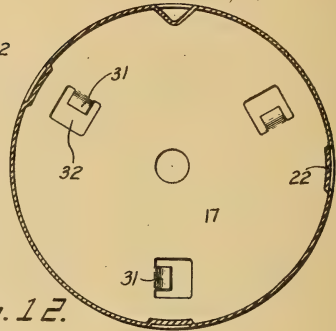


Fig. 12.

Fig. 5.

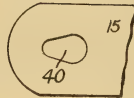
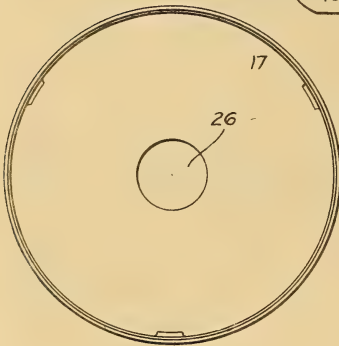


Fig. 6.

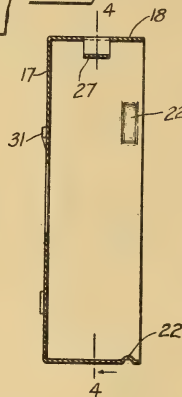


Fig. 7.



Fig. 8.

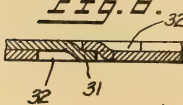
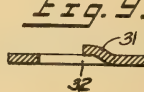


Fig. 9.



INVENTOR:

J. H. Dooley.

By his Attorney, William H. Reid.

UNITED STATES PATENT OFFICE.

JAMES H. DOOLEY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO DE CAMP AND SLOAN, INC., A CORPORATION OF NEW JERSEY.

MOTOR FOR PHONOGRAPHS.

1,246,401.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed January 3, 1917. Serial No. 140,382.

To all whom it may concern:

Be it known that I, JAMES H. DOOLEY, a citizen of the United States, and resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Motors for Phonographs, of which the following is a specification.

The object of the present invention is to provide an improved form of mounting for the double coil spring of the usual evolute form generally employed for driving phonographs and similar instruments, that will be simple and economical to construct, and also to assemble; whereby the simple insertion of these springs in the casings and bringing them together on the bearing member will cause them to assume an interlocking position at once ready for use; and which further will facilitate the removal of a spring and substitution, in case of injury.

A further object is to improve means in such a device for more readily attaching the extremities of the springs to the bearing members, and to the casings.

In the accompanying drawings illustrating one embodiment of my invention, Figure 1 is vertical section of the motor and connected parts. Fig. 2 is a section on the line 2—2 of Fig. 1 taken at a right angle to that view. Fig. 3 is a bottom plan of one of the spring casings. Fig. 4 is a section on the line 4—4 of Fig. 6. Fig. 5 is a plan of one of the casing covers. Fig. 6 is a vertical section through one of the casings. Fig. 7 is a vertical section of one of the casing covers. Fig. 8 is a vertical section enlarged, showing the locking lugs of the casings in one portion. Fig. 9 is a similar view of one lug. Fig. 10 shows enlarged the locking of the outer end of one spring. Fig. 11, is a cross section into the spring shaft, at 11, showing the locking of the spring inner end to the shaft sleeve; and Fig. 12 shows the inner end of the spring.

As shown in the drawings the frame 12 of any suitable form, is suspended from the top board 13 of the instrument. In this frame rotates the shaft 14, that projects up through the top, to receive the usual table on which the record disk is placed to be rotated.

It is customary in this art to provide a

pair of evolute springs that are connected by their outer ends, while the inner ends of the springs are connected, one to drive the table shaft, and the other with the winding means, such as a handle and connecting gears. By this arrangement the motor can be wound up at one end, while the other end is operating to revolve the table shaft, and the instrument need not be stopped for winding.

As shown I have provided a pair of coil springs 15 and 16 that are mounted in separate casings. The spring 15 is mounted in a casing formed of a drum and a cap. The drum comprises a base 17 and a side or flange 18 integral therewith, of cylindrical form as shown in Figs. 5 and 6. A cap 19 of similar form is provided whose flange 20 fits snug on the flange 18 of the drum, as indicated in Fig. 1. Locking means retain the cap on the drum, such as bent portions or lugs 21 in the cap that will spring into similar socket portions 22 in the drum flange; that will retain the cap on the drum under normal conditions, but permit easy removal to replace the spring. The other spring 16 is provided with a similar casing comprising a drum 23 and a cap 24 thereon. These two drums with their caps are constructed identically the same, but placed in reverse positions, back to back, on the bearing member therefor; the drum having a central opening 25, and the cap having a larger central opening 26, to receive the bearing member.

Special means are provided on the drums to engage the outer ends of the springs, and as shown I provide a depressed portion or strip 27 on the drum flange 18, see Figs. 3 and 6; that forms a kind of eye, that is caused to project into the slotted portion 28 of the end of the spring 15; whereupon a pin 29 is passed through the eye and secures the spring to the drum flange, as shown in Figs. 1 and 10. The same fastening means is provided at 30 for the outer end of the spring 16.

For the purpose of practically securing together the outer ends of the two springs, since the springs are fast to the casings or drums, it is only necessary to secure the drums together. For this purpose I provide one or more projections 31 in the base 17 of each drum, adjacent which is an opening 32 in the base, as shown in Fig. 3. These

projections extend outward from the drum at an angle and then are bent to lie parallel with the drum, as shown in Fig. 9.

Three of these are shown that project in the same circular or rotative direction. But when the drums are brought together, back to back, obviously, the projections extend in opposite circular directions. The projections of each drum are caused to enter the openings 32 adjacent the projections of the other drum, and then the drums are given a twist that will cause each projection to overlie that of the other drum and interlock as indicated in Fig. 8. This is so designed that the tension of the wound springs will retain the lugs in this locking position and they cannot loosen unless the drums are turned in the reverse direction; which, of course, cannot be done by the winding up of the spring and only by actually turning the drums in such reverse direction.

I provide a sleeve for each of the drums, having means to engage and lock the inner ends of the two springs. As shown a rod or shaft 33 is mounted in the frame 12, and has sleeves 34 and 35 mounted to rotate thereon. The sleeve 34 projects into the drum 17 and has the inner end of the spring 15 secured thereto. For this purpose I provide a stud 36 having a tapered head, which stud is passed through an opening 37 in one side of the sleeve, and fits into a tapered opening 38 in the opposite side of the sleeve, to have its hook portion 39 project beyond the sleeve. The shaft 33 being passed into the sleeve will retain the stud in this position, as will be understood by referring to Fig. 11. The inner end of the spring is provided with a tapered slot 40 as shown in Fig. 12, at which position it engages the stud in its hook extremity, and is thus retained in position by this hook, and the adjacent convolution. A similar stud 41 is arranged in the sleeve 35 to secure the inner end of the spring 16.

As shown, the sleeve 35 has a gear portion 42, engaging a worm 43 on the winding shaft 44. The other sleeve 34 has a gear 45 fastened thereon meshing with a gear 46 on a shaft 47. The latter carries a gear 48 engaging a gear 49 on the table shaft 14. This train of gears serves to drive the table much faster than that of the spring sleeves.

It will thus be seen that when the handle shaft 44 is turned, the sleeve 35 will wind up the coil spring 16 from its inner end. This will tend to turn the casing or drum 23, and the latter being interlocked with the other drum will rotate the same and wind up the spring 16 from the outer end connected to the drum. This will serve to put both springs under equal tension as they are being wound. When the table is released it will be turned from the sleeve 34 by the unwinding of the two springs,

It will thus be understood that the spring drums are of very simple construction, being readily constructed by cutting and shaping dies. The caps for the drums are simple and are simply applied and held by spring pressure. The springs are secured to the integral eyes on the drums by the mere insertion of a pin. The connection of the springs with the two sleeves is also very simple and cheap to make and assemble. The studs are inserted and the sleeves are fast on the supporting shaft and the springs engage the hooks of the studs. The mere bringing together of the two drums and turning them will cause the hook projections to interlock, and no other fastening means is needed, nor any mechanical operation requiring tools to secure them together. When a spring is to be replaced it can be very readily removed by taking off the cover and slipping out the pin, and it is easily substituted.

Having thus described my invention, what I claim is:—

1. The combination of a shaft, a sleeve loose on the shaft, a coil spring on the sleeve having the inner end fast thereto, a casing surrounding the spring and secured to its outer end, a second sleeve loose on the shaft, a second coil spring fast at its inner end to the second sleeve, a second casing surrounding the second spring and secured to its outer end, said casings having their contiguous side faces provided with integral locking means, comprising a hook portion projecting from each casing, to engage a similar portion on the opposite casing and adapted to interlock on bringing the casings together and turning one relative to the other, each casing comprising a drum portion formed of a base and a cylindrical flange and a cap or cover adapted to fit over the flange and provided with integral locking means.

2. The combination of a bearing member, a coil spring, on the bearing member having the inner end fast thereto, a casing surrounding the spring and secured to its outer end, a second bearing member, a second coil spring fast at its inner end to the second bearing member, a casing surrounding the second spring and secured to its outer end, said casings having their contiguous side faces provided with integral locking means, comprising a hook portion projecting from each casing and adapted to interlock on bringing the casings together and turning one relative to the other, each casing comprising a drum portion formed of a base and a cylindrical flange, a cap or cover adapted to fit over the flange and provided with integral locking means.

3. The combination of a bearing member, a coil spring on the bearing member having the inner end fast thereto, a casing sur-

rounding the spring and secured to its outer end, a second bearing member, a second coil spring fast at its inner end to the second bearing member, a casing surrounding the second spring and secured to its outer end, said casings having their bases contiguous and provided with integral locking means arranged to interlock upon bringing the bases together and rotating them in the direction to tension the springs.

4. The combination of a bearing member, a coil spring on the bearing member having the inner end fast thereto, a casing surrounding the spring and secured to its outer end, a second bearing member, a second coil spring fast at its inner end to the second bearing member, a casing surrounding the second spring and secured to its outer end, said casings having their bases contiguous and provided with integral locking means arranged to interlock upon bringing the bases together in any relative position and rotating them in the direction to tension the springs.

5. The combination of a bearing member, a coil spring on the bearing member having the inner end fast thereto, a casing surrounding the spring and secured to its outer end, a second bearing member, a second coil spring fast at its inner end to the second bearing member, a casing surrounding the second spring and secured to its outer end, said casings having their bases contiguous and provided with integral locking means comprising a hook portion projecting from each casing adapted to engage a similar portion on the other casing whereby the

hooks will interlock on bringing the casing bases together and turning one relative to the other.

6. The combination of a bearing member, a coil spring on the bearing member having the inner end fast thereto, a casing surrounding the spring and secured to its outer end, a second bearing member, a second coil spring fast at its inner end to the second bearing member, a casing surrounding the second spring and secured to its outer end, said casings having their bases contiguous and provided with integral locking means arranged to interlock upon bringing the bases together and rotating them in the direction to tension the springs, said casings being identical in construction whereby they are interchangeable on the bearing members.

7. The combination of a bearing member, a coil spring on the bearing member having the inner end fast thereto, a casing surrounding the spring and secured to its outer end, a second bearing member, a second coil spring fast at its inner end to the second bearing member, a casing surrounding the second spring and secured to its outer end, said casings having their bases contiguous and provided with integral locking means comprising a hook portion projecting from each casing adapted to engage a similar portion on the other casing whereby the hooks will interlock on bringing the casing bases together and turning one relative to the other, said casings being identical in construction whereby they are interchangeable on the bearing members.

JAMES H. DOOLEY.

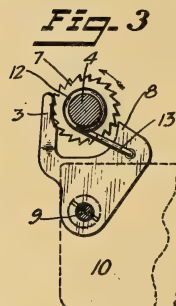
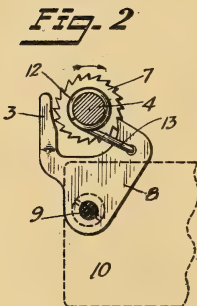
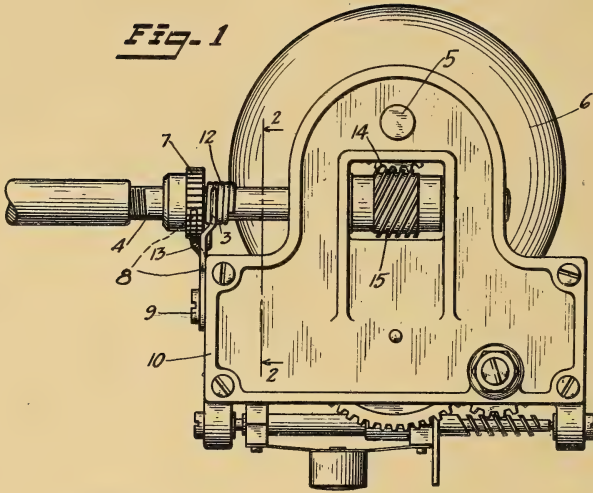
SILENT PAWL FOR PHONOGRAPHS.

1,246,402 ----- J. H. Dooley.
Patented Nov. 13, 1917.
Filed May 21, 1917.

J. H. DOOLEY.
SILENT PAWL FOR PHONOGRAPHS.
APPLICATION FILED MAY 21, 1917.

1,246,402.

Patented Nov. 13, 1917.



Inventor
James H. Dooley.
By *Wm. H. Reid* Attorney

UNITED STATES PATENT OFFICE.

JAMES H. DOOLEY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO DE CAMP AND SLOAN, INC., A CORPORATION OF NEW JERSEY.

SILENT PAWL FOR PHONOGRAPHS.

1,246,402.

Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed May 21, 1917. Serial No. 169,864.

To all whom it may concern:

Be it known that I, JAMES H. DOOLEY, a citizen of the United States, and resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Silent Pawls for Phonographs, of which the following is a specification.

This invention relates to the holding devices employed with the winding shaft of a spring motor, and is especially designed for use with phonograph motors that are adapted to be wound up from one end of a coil spring device while the spring is operating to unwind at its other end to drive the instrument.

The object of the invention is to provide a device of this character that will be noiseless in its winding operation by reason of the pawl or holding member being lifted and held free from the ratchet or holding means on the shaft automatically as soon as the winding shaft begins to turn; and which members will connect at once on release of the winding member and lock the shaft.

In the accompanying drawing showing one embodiment of my invention applied to a phonograph motor, Figure 1 is a side elevation of the device. Fig. 2 is a section on the line 2—2 of Fig. 1; and Fig. 3 shows the parts of the latter view in another position.

As shown in the drawing, 4 represents the winding shaft of the motor having a suitable connection with the shaft 5 as by gears 14 and 15. It is to be understood that turning of the shaft 4 in the rotative direction indicated by the arrow in Fig. 3 serves to wind up the spring, contained in the casing 6 and by suitable means not herein set forth, the spring unwinding at its other end serves to rotate the record table of the instrument. Therefore means are provided for preventing the tensioned spring from turning the shaft 4 in the opposite direction.

Suitable means are provided for permitting the shaft 4 to turn in the winding direction, while holding means operate to engage the shaft and prevent its reverse rotation. As shown a ratchet wheel 7 is fast on the shaft 4, whose teeth are engaged by a pawl 8 mounted on a fixed pivot 9 on the frame 10, to swing to engage the ratchet wheel.

Controlling means are provided in connection with the shaft 4 and the holding means such as the pawl 8. As represented in the drawing I provide a helical coil spring 12 wound around the shaft 4 with one end 13 extended and connected with the pawl 8; while the other end is free on the shaft. By this means when the shaft 4 is turned in the direction of the arrow indicated in Fig. 3 the frictional engagement of the coil spring on the shaft will cause slight turning of the spring and the extension 13 will advance to move the pawl 8 away from the ratchet wheel 7. This will take place at once and the pawl will not ride on the ratchet to make the usual noise where a pawl is free to engage the ratchet teeth. But as soon as the shaft 4 is free from the turning movement of its handle, the spring of the machine that has been put under tension will tend to rotate the shaft 4 in the contrary direction, as indicated by the arrow in Fig. 2. This will cause a friction engagement with the coil spring to turn it in the same direction and pull on the extension 13, whereby the pawl 8 is drawn into engagement with the ratchet wheel, as shown in Fig. 2. This will take place at once and hence the shaft 4 is prevented from unwinding, and the pawl will be retained in this, its normal position.

The pawl 8 is also shown as provided with an arm 3 to limit the swing of the pawl away from the ratchet wheel; in case the spring should break, or become disarranged. The pawl normally moves vertically downward to engage the wheel so it would fall by gravity in case of non-action of the spring.

Having thus described my invention, what I claim is:—

1. The combination with a winding shaft, and a ratchet wheel fast thereon, of a furcated holding pawl mounted to straddle the shaft and swing to engage the ratchet wheel with one furcation to prevent unwinding movement of the shaft, and a controlling member on the periphery of the shaft having a frictional engagement only therewith and connected with the specified furcation of the pawl, whereby turning of the shaft in a winding direction will cause the controlling member to swing and hold the pawl free from the ratchet wheel, while reverse

turning of the shaft will cause the controlling member to swing and shift the pawl against the ratchet wheel to lock the shaft.

2. The combination with the spring motor winding shaft (of a phonograph), and a ratchet wheel fast thereon, of a holding pawl mounted to swing to engage the ratchet wheel to prevent unwinding movement of the shaft, and a helical spring secured to the shaft by a plurality of coils for frictional

engagement only with the shaft with one end portion extended to engage the pawl and normally hold the pawl engaging the ratchet wheel through the instrumentality of the spring motor intending to reverse the rotation of the shaft, the spring on turning of the shaft in a winding direction being frictionally engaged by the shaft to swing and shift the pawl free of the ratchet wheel.

JAMES H. DOOLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

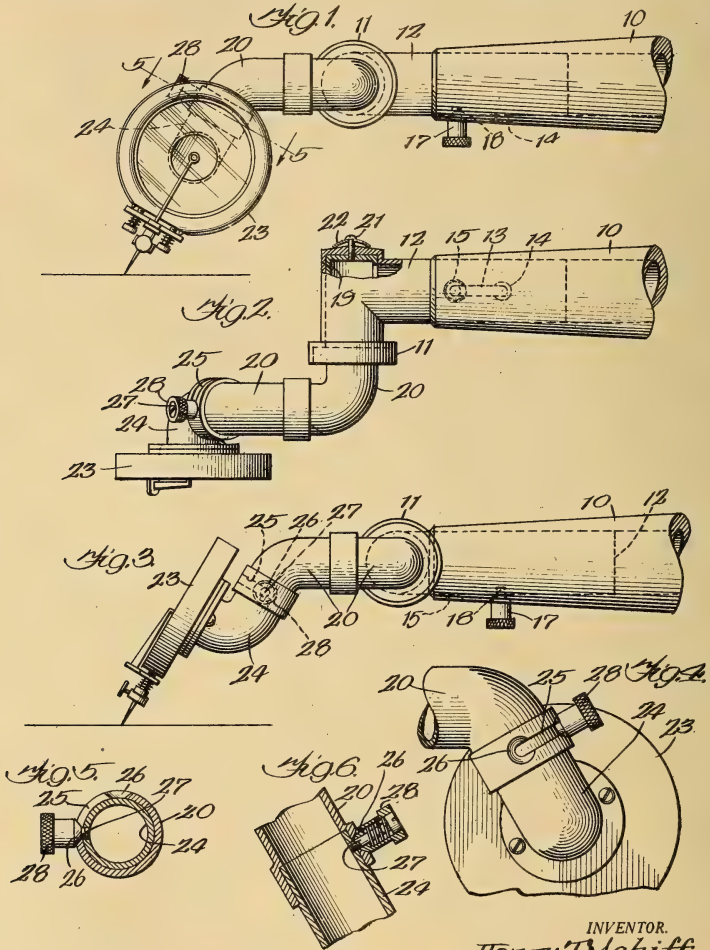
SOUND REPRODUCING MACHINE.

1,246,474 ----- H. T. Schiff.
Patented Nov. 13, 1917.
Filed Jan. 19, 1917.

H. T. SCHIFF.
SOUND REPRODUCING MACHINE.
APPLICATION FILED JAN. 19, 1917.

1,246,474.

Patented Nov. 13, 1917.



INVENTOR.
Henry T. Schiff.
BY *J. Gochman*
ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY T. SCHIFF, OF CHICAGO, ILLINOIS.

SOUND-REPRODUCING MACHINE.

1,246,474.

Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed January 19, 1917. Serial No. 143,203.

To all whom it may concern:

Be it known that I, HENRY T. SCHIFF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Reproducing Machines, of which the following is a specification.

This invention relates in general to improvements in sound reproducing machines, but more particularly to improvements in tone arms therefor, and one of the objects of the invention is to provide an improved construction of tone arm and sound box therefor, whereby the sound box may be readily adjusted or positioned to adapt the same for playing records of different types such as records having vertical sound undulations or lateral sound undulations. A further object is to provide improved means whereby the length of the tone arm may be varied to compensate the varying distances between the stylus and the pivotal axis of the arm, when the sound box is adjusted.

A further object is to provide improved means embodying a joint, whereby the sound box is adapted for vertical adjustment and improved means whereby any wear on the parts of the joints may be readily taken up and the joint maintained tight.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing illustrating the invention and in which:

Figure 1 is a side elevation of a tone arm embodying this invention and showing the sound box in position to play one type of record. Fig. 2 is a top plan view of the parts shown in Fig. 1.

Fig. 3 is a view similar to Fig. 1 showing the sound box in position to play another type of record.

Fig. 4 is an elevation of the sound box and the adjacent portion of the tone arm as taken from the opposite side of Fig. 1.

Fig. 5 is a detail sectional view taken on line 5-5, Fig. 1.

Fig. 6 is a detail sectional view taken through the tone arm and fastening means for the sound box.

Referring more particularly to the draw-

ing, the numeral 10 designates the main section of a hollow tone arm and 11 designates generally a joint section having a tubular portion 12 which telescopes with the main section 10 and is also adapted to be rotated in said section. The main section 10 is provided with a slot 13 which extends longitudinally thereof and provided adjacent the extremities of the slot are open seats 14, 15, which are adapted to receive a yielding portion 17 connected with a pin 18. This pin 18 is secured to the portion 12 and passes through the slot 13, so that the yielding portion 17 will be located outside of the main section 10 and is adapted to be seated in the seats 14, 15 at the ends of the slot. The joint section 11 is provided with a bearing 19 into which one end of a tubular arm 20 is journaled, and the section 12 is preferably provided with an enlarged entrance opening forming a surrounding flange, and which enlarged portion is adapted to receive a collar on the sleeve 20 to form an extended bearing. The joint parts are held together preferably by means of a screw 21 passing through the end of the bearing and having engagement with the end of the arm 20. Interposed between the head of the screw 21 and the end of the bearing 19 is an elastic washer 22, preferably in the form of a piece of metal concaved. This washer is adapted to take up the wear of the parts of the joint and thereby hold the joint tight.

A sound box 23 is provided with a tubular portion 24 which latter is rotatably connected with the arm 20 so that the sound box may be turned from one position to another to adapt it for playing records of different types.

The sound box and the arm 20 are connected together in any suitable manner, preferably by telescoping the end of the portion 24 of the sound box with the free end of the arm 20. The arm 20 is preferably provided with a slot 25 having seats 26 arranged at the ends thereof. A pin 27 is secured to the sound box and passes through the slot 25 in the arm 24. Connected with the pin 27 is a yielding cap 28 which is adapted to be seated in the seats 26 to temporarily lock the sound box in adjusted position. When the parts are in the position shown in Fig. 1, the sound box will adapt itself for playing one type of record and for playing another type of record, the sound box must be adjusted into the position shown in Fig. 3.

This adjustment of the sound box from one position to another varies the distance between the point of the stylus and the pivotal axis of the arm and therefore in order to compensate these varying differences the slot 13 is provided. When the sound box is in the position shown in Fig. 1, the pin 18 will be adjacent the forward end of the slot 13, but when another form of record is to be played, the pin 18 will be at the other end of the slot and the yielding portion 17 will be seated in one or the other of the seats 14, 15 to temporarily lock the parts.

The joint formed by the arm 20 and the bearing 19 permits the sound box to be moved vertically not only during the playing of the record but also at any other desired time so as to permit the stylus to be withdrawn and replaced.

What is claimed as new is:

1. In a sound reproducing machine, a tone arm having a transverse bearing adjacent one end, a sound box section adjacent said end, one end of the section being journaled in said bearing, a sound box adjustably connected to the other end of said section, an annular portion encompassing the entrance opening of the bearing, the diameter of said portion being greater than the adjacent portion of the bearing to form a seat adjacent the end of the bearing, there being a shoulder on said sound box section adapted to extend into the said annular portion and rest against said seat, and means engaging the

end of said sound box section and the said bearing for securing the parts together, the said means embodying an elastic element.

2. In a sound reproducing machine, a tone arm having a transverse bearing adjacent one end, a sound box section adjacent said end, one end of the section being journaled in said bearing, a sound box adjustably connected to the other end of said section, an annular portion encompassing the entrance opening of the bearing, the diameter of said portion being greater than the adjacent portion of the bearing to form a seat adjacent the end of the bearing, there being a shoulder on said sound box section adapted to extend into the said annular portion and rest against said seat, and means engaging the end of said sound box section and the said bearing for securing the parts together, the said means embodying an elastic element engaging the end of the bearing and a fastening device passing through the elastic member and engaging the end of the sound box section, whereby the tension of the elastic member may be varied.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 16th day of January, A. D. 1917.

HENRY T. SCHIFF.

Witnesses:

IRMA M. BARING,
J. A. JOCHUM, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

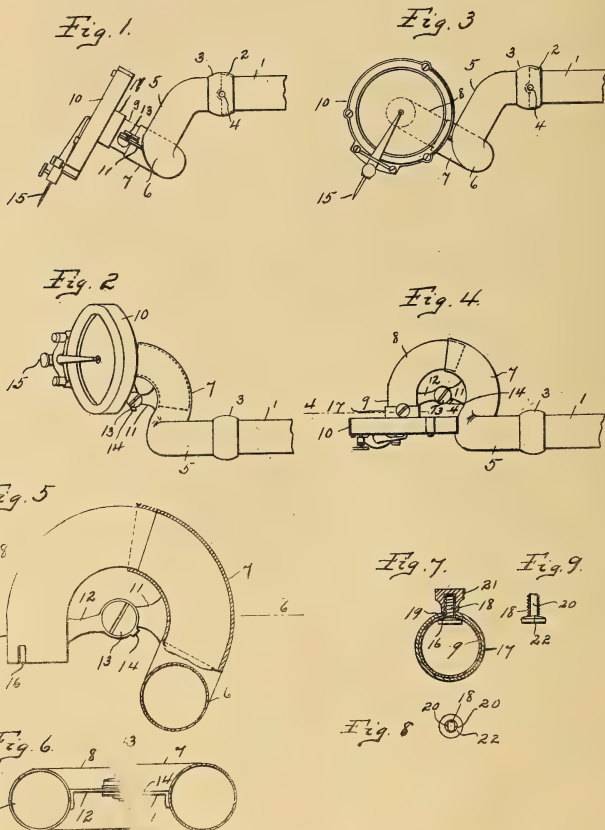
ROUND BOX ADAPTER.

1,846,500 -- ----- A. Vaseelli.
Patented Nov. 13, 1917.
Filed April 6, 1917.

A. VASSELLI.
SOUND BOX ADAPTER.
APPLICATION FILED APR. 5, 1917.

1,246,506.

Patented Nov. 13, 1917.



Anthony Vasselli INVENTOR.

BY
Louis M. Sanders ATTORNEYS.

UNITED STATES PATENT OFFICE.

ANTHONY VASSELLI, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO OTTO HEINEMAN PHONOGRAPH SUPPLY CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SOUND-BOX ADAPTER.

1,246,506.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed April 5, 1917. Serial No. 159,874.

To all whom it may concern:

Be it known that I, ANTHONY VASSELLI, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Sound-Box Adapters, of which the following is a specification.

My invention relates to devices whereby the talking machine may be adapted to play records of the laterally undulating type or records of the "hill and valley" type and it consists primarily in the tone arm of the usual construction having, at its free extremity a peculiarly shaped connection to which the sound box may be attached and by which the sound box may be shifted from a position in which a diaphragm lies in the vertical plane to a position in which the plane of the diaphragm will be at an angle of about 60 degrees to the plane of the record and this without removing the sound box in any way or changing the radial distance between the center of the tone arm pivot and the point of the needle.

In the patent to Catucci No. 1,156,130, dated October 12, 1915, an adapter is disclosed which is designed as an attachment for one of the well known types of talking machines now on the market so that when in use records of the "hill and valley" type may be played, or by removing the adapter and fastening the sound box to the tone arm in the usual manner, records of the laterally undulating type may be played. In the present invention none of the parts are removed, and it is only necessary to swing the sound box from one position to the other and vice versa to play all styles of records now on the market.

In carrying out my invention I make use of a structure substantially as described in the following detailed description and illustrated in the accompanying drawings wherein:

Figure 1, is a side elevation of my improvement with a well-known sound box attached thereto and so much of a tone arm as is necessary to illustrate the invention arranged to reproduce records of the hill and valley type.

Fig. 2, is a plan view of the same.

Fig. 3, is a side elevation similar to Fig.

1 but showing the sound box arrangement to play records of the lateral undulating type.

Fig. 4, is a plan view of the same.

Fig. 5, is a fractional view partly in section of my improvement.

Fig. 6, is a cross section of line 6—6, of Fig. 5.

Fig. 7, is a cross section of line 7—7, of Fig. 4, and illustrates an improved sound box connection with the tone arm, or adapter.

Fig. 8, is a plan view of the screw used in such connection.

Fig. 9, is a side elevation of said screw showing one of its flattened sides.

Similar reference numerals refer to like parts throughout the specification and drawings.

The usual tone arm 1, may be of any type and mounted upon the frame of the talking machine in the usual manner. Its free end is provided with a ball 2, which is received by the socket 3, of my improvement. The horizontal pivot pin 4, connects the ball and socket together, so that the sound box may have a slight vertical oscillation. From the socket 3, extending horizontally and in a substantial alinement with the tone arm 1, is a short section of tube which is bent downwardly at an angle of about 60 degrees as at 5, and is provided with a horizontally bent elbow 6, from which elbow the tube extends in the circular form as at 7. The plane of the axis being substantially at a right angle to the axis of the part 5, the plane of this circular part 7, is inclined to the horizontal or to the plane of the record with which it is used at an angle of about 30 degrees. Fitted in the free end of the circular part 7, is a telescopic circular tube part 8, terminating in a short straight end as 9, to which the sound box 10, may be attached. In order that the circular tube 8, may telescope within the tube 7, without bending or twisting, I provide the centering device which consists of the arm 11, rigidly secured to the circular tube 7, and a moving arm 12, secured to the straight portion 9, of the circular tube 8. These arms overlap each other at the common center of the two circular parts 7, and 8, and are provided with a central pivot screw 13, for connecting them together. Thus the two arms 11, and 12, with their

centering screw 13, always accurately guide the telescopic action of the two circular tubes 7, and 8. In order, however, that the two parts may not separate I provide the arm 12, with the lateral extension 14, and bend the same down as shown in Fig. 6, so that when the circular tube 8, is in its extended position the projection 14, will engage the side of the arm 11, and thus stop further rotation of the arm 12, upon the pivot screw 13. In this manner it will readily be seen that the circular tube 8, may telescope into the circular tube 7, without bending and without any twisting of the parts. When the tube 8, is in its innermost position, the edge of the arm 12, will strike against the outer end of the tube 7, so as to limit the inward movement of the circular tube 8.

The arrangement thus far described is such that the distance between the point of the needle 15, will, in the positions as shown in Figs. 1, and 3, respectively swing in the arc of the same circle about the pivot center of the tone arm 1. This is desirable for the reason that as described in the above named Catucci patent, in order that the needle of the sound box may properly track in the record groove. The parts must be adjusted so that the tone arm, swinging about its center, must carry the point of the needle in an arc which passes through the center of the record disk. If the needle varies materially from this arc, then it is liable to jump out of the record groove and race across the face of the disk to the obvious injury of the record and certainly spoiling the rendition of the selection upon it. As hitherto pointed out it will be readily seen that the plane of the common axis of the two tubes 7, and 8, lying as it does at an angle of 80 degrees elevation from the plane of the record, the angle between the face of the record and the needle will always be the same, no matter in which position the sound box may stand and that angle will be about 60 degrees from the plane of the record. This angle has been found to be the most effective for clear and distinct reproduction.

In Figs. 7, 8, and 9, I have shown an improved method of securing the sound box to the end of the tone arm. It consists in providing the end of the tube 8, with an open slot 16. The thimble 17, of the sound box 10, is provided with a headed screw 18, such screw projecting through a slightly elongated slot 19, in the thimble 17. The screw 18, has its sides flattened as at 20, to fit such slot, so that when in position the screw 18, will not turn. The threaded end of the screw is provided with a thumb nut 21, which may be screwed down to the outer face of the thimble 17. When it is desired to place the sound box upon the straight extension 9, it is slid over in the usual manner with the head of the screw 18, inside of the straight exten-

sion 9, and the body of the screw passing into the slot 16. When the sound box is pushed home, then the nut 21, may be screwed down and thus the sound box will be clamped firmly to the extension 9. The inner or upper face of the head of the screw 18, is spherical as at 22, so that it may bear upon the inner face of the extension 9, without distorting the same.

I am aware of the fact that it has been common to secure the sound box by means of a screw passing through the thimble such as 17, to bear upon some part of the tone arm 1. This method of fastening has the disadvantage that in time it distorts the end of the tube because of the firmness with which the screw is turned. In the present case the clamping is firm, without any tendency to distortion or denting of the tube.

It will thus be seen that I have accomplished the object of my invention by means simple and effective, and not liable to get out of order, even in the hands of the least experienced.

I claim:

1. In an adapter for sound boxes, the combination of a pair of tubes each bent into the arc of a circle, said tubes being hinged with one telescoping into the other, with means upon one of said tubes for securing a sound box thereto, means for connecting the other tube to the tone arm of a talking machine and means carried by the hinge for limiting the telescopic action of said tubes.

2. In an adapter for sound boxes, the combination of a pair of hinged telescoping tubes each bent into the arc of a circle, a sound box secured to one of said tubes, means for connecting the other tube to the free end of a talking machine tone arm for slight vertical oscillation and means carried by the hinge for limiting the telescopic action of the tubes.

3. In an adapter for sound boxes, the combination of a pair of telescoping tubes each bent into the arc of a circle, a hinged centering device connected respectively to each of said tubes for guiding the one into the other, means for connecting one of said tubes to a talking machine tone arm for slight vertical oscillation and means carried by the hinge for limiting the telescopic movement of the tubes.

4. In a sound box adapter, the combination of a pair of telescoping tubes each bent into the arc of a circle, means for connecting one of said tubes to a talking machine tone arm, for slight vertical oscillation, with the plane of the common axis of said tubes at a substantial angle to a horizontal plane.

5. In a sound box adapter for talking machines the combination with the tone arm, of a tubular member secured to the free end of said tone arm for slight vertical

oscillation, said member extending for a short distance in alinement with said tone arm and then bent at a downwardly inclined angle, then bent at substantially a right angle, and the free end curved into the arc of a circle, the plane of which is at right angles to the downwardly inclined portion of said tube, a second tube bent into the arc of a circle and telescoped into the circular part of said first named tube, and a sound box secured to the free end of said first named tube.

6. In a sound box adapter for talking machines, the combination of a pair of tubes each bent into the arc of a circle, with one telescoping into the other, means for securing a sound box to one of said tubes and means for securing the other tube to the free end of a talking machine tone arm, with the plane of the common axis of said tubes at an angle of about 30 degrees from the horizontal.

7. In a sound box adapter for talking ma-

chines, the combination of a sound box and a tone arm, with means connecting the same comprising a pair of hinged telescoping arc shaped tubes, one of which is provided with an angular extension for connection with the tone arm whereby the other tube may be extended to bring the diaphragm of said sound box into a vertical plane, or telescoped into the first named tube to bring said diaphragm to an angle of about 60 degrees from the horizontal and means carried by the hinge for limiting the telescopic movement of said tubes.

8. In a sound box adapter for talking machines, the combination of a pair of arc shaped telescoping tubes, an arm extending from the side of each of said tubes respectively to the common center of their curvature, a centering screw connecting said arms at said center, and a stop upon one of said arms for engaging the other arm for limiting the telescoping action of said tubes.

ANTHONY VASSELLI.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ACOUSTIC DIAPHRAGM.

1,246,552 ----- C. F. Cockson.

Patented Nov. 13, 1917.

Filed March 19, 1917.

C. F. COOKSON.
ACOUSTIC DIAPHRAGM.
APPLICATION FILED MAR. 19, 1917.

1,246,552.

Patented Nov. 13, 1917.

Fig. 1.

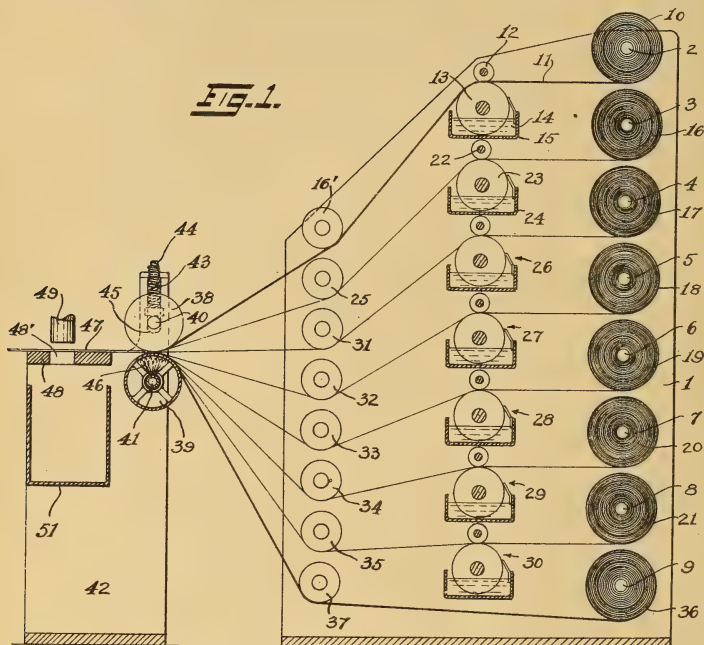


Fig. 2.

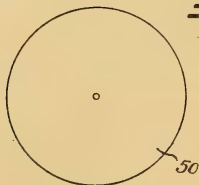


Fig. 3.

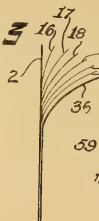
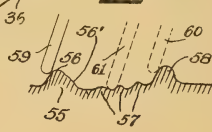


Fig. 4.



Witnesses:
Charles H. Hinton
H. D. Pinner

Inventor:
Clarence F. Cookson.
By his Att'y, J. H. Richards

UNITED STATES PATENT OFFICE.

CLARENCE F. COOKSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO ROBERT L. McELROY,
OF NEW YORK, N. Y.

ACOUSTIC DIAPHRAGM.

1,246,552.

Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed March 19, 1917. Serial No. 155,699.

To all whom it may concern:

Be it known that I, CLARENCE F. COOKSON, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Acoustic Diaphragms, of which the following is a specification.

This invention relates to improvements in diaphragms and the method of making the same, and more particularly to such a diaphragm for a phonograph constructed of a laminated fabric. Preferably two layers of vellum or other parchment are employed, between which is a plurality of layers of tissue paper having one side coated with an adhesive substance providing means for uniting the layers of tissue and for securing one of the layers of vellum on each side thereof.

Diaphragms constructed of metal, mica and paper have been heretofore employed, but it has been long recognized that such diaphragms have a relative slow recovery, which will not permit the needle actuated thereby to contact with all the minute variations of the sound grooves of a record. The present improvement, however, consisting of a laminated fabric diaphragm, has a very rapid recovery causing the needle to contact with every variation of groove on the record, no matter how minute, thereby developing accurate reproduction and a greater resonance.

Another object of the present invention, is to devise a simple and inexpensive method of making the laminated fabric diaphragm.

A still further object of the present improvement, is to devise a phonograph diaphragm which is constructed of cheap material and which may be manufactured at minimum expense.

Other objects and advantages of the present improvement will be set forth in the following description, one embodiment of which is illustrated in the drawings, in which:

Figure 1, is a diagrammatic view of an apparatus for making sheets of laminated fabric and stamping diaphragms therefrom.

Fig. 2, is a side elevation of one of the completed diaphragms.

Fig. 3, is a side elevation of a diaphragm showing the layers of fabric composing it pulled apart.

Fig. 4 is a diagrammatic view of a sound wave on a record and illustrating the dif-

ference in the action of a needle operated in conjunction with a laminated fabric diaphragm and a needle operated in conjunction with a metal, mica or paper diaphragm.

Referring now to the drawings in detail, in which like reference numerals designate similar parts, throughout the several figures; 1 represents a suitable framework at one end of which eight shafts are mounted in spaced relation and one above the other. These shafts are numbered 2 to 9 inclusive on the drawing. A roll of fabric, preferably vellum, 10 is revolvably mounted on the shaft 2, the free end of which is passed between a roller 12, and a roller 13, which latter roller has its lower portion arranged to dip within an adhesive substance 14, carried within a suitable tank 15, the said rollers and tank being mounted within the framework 1. The end of the vellum 10 is then passed beneath a guide roller 16' mounted in the framework 1 and thence fed to a pressing machine, hereinafter to be described.

Six rolls of tissue paper numbered 16 to 21, inclusive, are revolvably mounted on the shafts 3 to 8, respectively, the ends of the tissue paper 16 being passed between contacting rolls 22 and 23, the roller 23 dipping within an adhesive substance carried within a receptacle 24, the said rollers 22 and 23, and receptacle 24 similar to and arranged directly beneath the receptacle 15. The end of the tissue paper 16 is then led beneath a guide roller 25 and thence to the pressing machine. The other five rolls of tissue paper have their free end passed through similar devices for coating their under surface with an adhesive substance, these devices being numbered 26 to 30, which operate upon the tissue paper rolls 17 to 21, respectively. The ends of these rolls of tissue paper are also led beneath guide rolls numbered 31 to 35 respectively and thence to the pressing machine. A second roll of vellum 36 is revolvably mounted on the bottom shaft 9, the free end of which does not pass through an adhesive coating device but directly beneath a guide roller 37 and thence to the pressing machine.

The free ends of all the sheets of tissue paper and the end of the sheets of vellum are drawn together one on top of the other and passed between two rolls 38 and 39 revolvably mounted upon shafts 40 and 41, carried in a framework 42. It will be noted

that all the layers of tissue paper are arranged one on top of the other and between the layers of vellum, and that the under surface of the sheet of vellum 2 and of all the sheets of tissue are coated with the adhesive substance 14 applied thereto by means of the applying devices heretofore described.

The sheets of tissue and vellum upon passing through the rolls 38 and 39 are pressed together by spring tension accomplished by means of springs 43 strained between set screws 44 and the shaft 40 which is vertically movable in a slot 45. Heat is applied to the laminated sheets by means of a suitable heating medium 46 contained within the roller 39. Upon leaving the rollers 39 and 40 the laminated sheets have been all secured together by the adhesive substance and the said adhesive therebetween dried. The unitary structure 47 then passes between a female die 48 having a plurality of openings 48' therein and a plurality of cored male dies 49 the cores of which are the desired size of the diaphragm. The male dies 49 are forced downwardly by any suitable means, entering the openings 48' in the female die 48 cutting out a plurality of completed diaphragms 50, which drop within a collection receptacle 51.

The adhesive substance used within the coating devices may be gum, resin, paraffin wax, shellac, varnish or any resinous gum.

Diaphragms constructed of metal, mica or paper have in practice demonstrated that they have what is known as a "slow recovery". This means that the needle upon being moved and released by a sound groove will not be returned quickly to its original position by the diaphragm for contact with the next portion of the sound wave of the groove.

In Fig. 4 a portion of sound wave is illustrated at 55 which has a large curve 56, a number of small curves 57 and another large curve 58. A needle 59 is illustrated as just leaving the large curve 56. When this needle is controlled by a mica, metal or paper diaphragm, upon being moved by the curve 56 will recover so slowly that the small waves 57 will be skipped in the rapid passage of the record and the needle strikes the second large sound wave 58 as is illustrated in dotted lines at 60.

When the needle 59 is controlled by a laminated diaphragm, however, upon being struck by the large curve 56 will be returned to its original position so quickly by the diaphragm that it will slide down the slope 56' of the large curve 56 and pass over all the small curves 57 as is illustrated in dotted lines at 61.

The laminated diaphragm will interpret all the "phrasing" of the notes which the

metal, mica or paper diaphragms will skip entirely due to their "slow return". 65

I claim:

1. A diaphragm for use in sound transmitting, receiving, recording, or reproducing apparatus, comprising a plurality of interposed layers of relatively thick and relatively thin fabric homogeneously secured together into a composite single sheet, the two outer layers being thicker than the inner layers.

2. A diaphragm consisting of two layers of vellum, a plurality of layers of tissue paper therebetween, and an adhesive substance uniting the vellum and tissue.

3. A diaphragm consisting of two layers of vellum, a plurality of layers of tissue paper therebetween, and an adhesive substance applied to one side of the vellum and tissue paper for uniting them.

4. A diaphragm for use in sound transmitting, receiving, recording, or reproducing apparatus, comprising interposed layers of relatively thick fabric and layers of relatively thin fabric, the thin fabric being of a different material than the thick, and an adhesive substance applied to one surface of each of the layers for securing them together.

5. A diaphragm consisting of two layers of relatively thick fabric and a plurality of layers of relatively thin fabric therebetween, and an adhesive substance uniting the said thick and thin layers of fabric.

6. A diaphragm consisting of a plurality of interposed layers of vellum and tissue paper secured together.

7. A diaphragm consisting of two layers of relatively thick fabric and six layers of relatively thin fabric therebetween, and an adhesive substance uniting the layers.

8. A diaphragm consisting of two layers of vellum, six layers of tissue therebetween, and an adhesive substance uniting the vellum and tissue.

9. A diaphragm consisting of a plurality of interposed layers of vellum and tissue paper and an adhesive substance for uniting them.

10. A diaphragm consisting of a plurality of interposed layers of vellum and tissue paper and an adhesive substance applied to one surface of the vellum and tissue for uniting them.

11. A diaphragm consisting of vellum and tissue paper secured thereto.

12. A diaphragm consisting of layers of vellum and layers of tissue paper secured thereto.

CLARENCE F. COOKSON.

Witnesses:

H. A. PATTON,

H. D. PENNEY.

REPRODUCER.

1,346,616

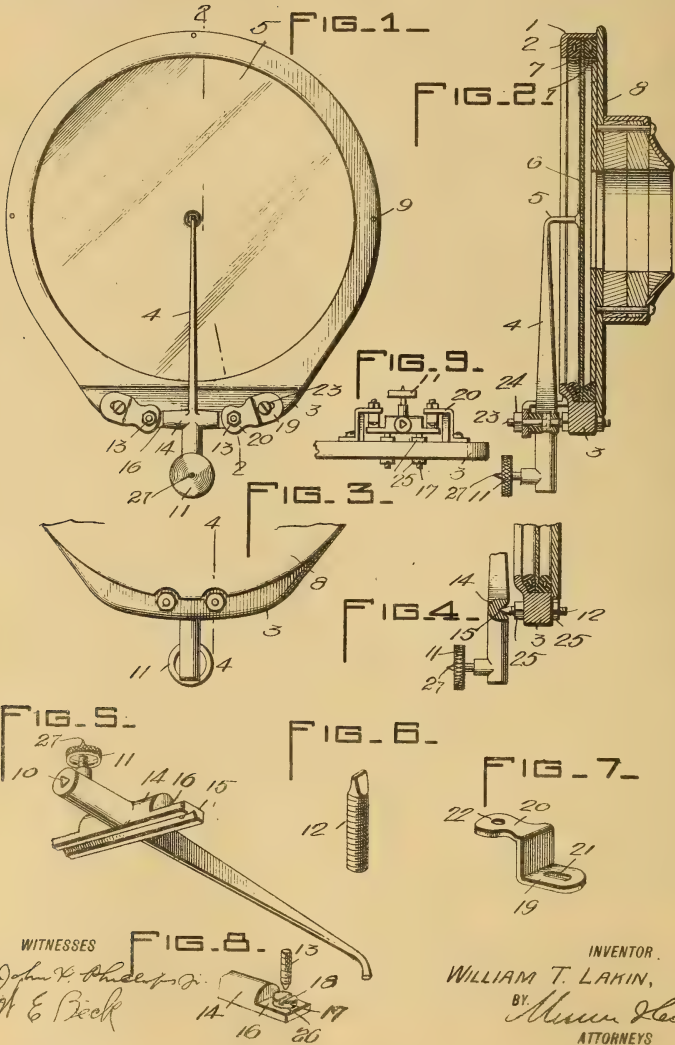
W. T. Lakin,
Patented Nov. 13, 1917.
Filed April 3, 1917.

W. T. LAKIN.
REPRODUCER.

APPLICATION FILED APR. 3, 1917.

1,246,616.

Patented Nov. 13, 1917.



WITNESSES

John V. Phelps
H. E. Beck

INVENTOR.

WILLIAM T. LAKIN,

BY
Munroe & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM TROUPE LAKIN, OF CUMBERLAND, MARYLAND.

REPRODUCER.

1,246,616.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed April 3, 1917. Serial No. 159,587.

To all whom it may concern:

Be it known that I, WILLIAM T. LAKIN, a citizen of the United States, and a resident of Cumberland, in the county of Allegany and State of Maryland, have made certain new and useful Improvements in Reproducers, of which the following is a specification.

My invention is an improvement in reproducers, and has for its object to provide a device of the character specified, wherein the stylus bar is mounted parallel with the diaphragm, and is supported in knife edge bearings and points, to give it the greatest possible freedom of movement, which influences or accentuates the diaphragm.

In the drawing:

Figure 1 is a front view of the reproducer.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a partial rear view.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 5 is a perspective view looking from below, of the stylus bar.

Fig. 6 is a similar view of one of the supporting pins for the stylus bar.

Fig. 7 is a perspective view of one of the mounting brackets for the bar.

Fig. 8 is a perspective view of one end of the fulcrum of the stylus bar looking from above, and

Fig. 9 is a partial edge view of the reproducer.

In the present embodiment of the invention, the diaphragm casing 1 is cylindrical, having at one edge a marginal laterally extending flange 2. The casing is thickened at one point in its circumference, as indicated at 3, to provide a firm mounting for the stylus bar 4, which has an angular lug 5 at its inner end connected with the diaphragm 6. The diaphragm is held between rubber gaskets 7, O-shaped in cross section, the said gaskets being held by the flange 2 and by the base plate 8, which is connected to the casing by screws 9. The diaphragm is thus held at the center of the casing. The stylus bar, which is provided at its outer end with the threaded opening 10 for the needle, and with the jeweled set screw 11 acting as a needle and for holding the needle in place, is supported between threaded pins 12 and 13, respectively, which engage a fulcrum 14 extending transversely of the stylus bar and integral therewith. This

fulcrum has on its under side a slightly V-shaped longitudinally extending groove 15, and at its upper side the ends of the fulcrum are cut away to form flattened surfaces 16. Screws 17 are threaded through these flattened surfaces, and the set screws have narrow kerfs 18 in their heads, as shown in Fig. 8, to engage the steel or jewel pointed ends of the pins 13, which are threaded through the brackets shown in Fig. 7. These brackets, as shown, comprise portions 19 and 20 offset laterally from each other, but parallel, the portion 19 having a slot 21, while the portion 20 has a threaded opening 22. These brackets are connected to the thickened edge 3 by means of screws 23, which are passed through the slots and engage openings in the thickened edge, and by loosening the screws the brackets may be adjusted toward and from each other, but principally to allow their movement, within limits, parallel to the stylus bar, and to the free ends of the portions 20. This adjustment permits the points 13 to occupy any relative position in the kerfs 18, and thus influence the equilibrium of the stylus bar 4. The portions 20 of the brackets are arranged to overlap the ends 16 of the fulcrum 14, so that the pins 13, when they are passed through the openings 22, may engage the kerfs of the screws 17. Each pin 13 is engaged by a lock nut 24 above the bracket to prevent displacement of the pin. The pins 12 are threaded through the thickened portion 3 from the rear side, and each pin is engaged by lock nuts 25 at opposite faces of the thickened portion. The preferably chisel-shaped points of the pins 12 engage the slightly V-shaped grooves 15 of the fulcrum.

It will be noticed from an inspection of Figs. 4 and 8 that the kerfs 18 of the screws 17 are at right angles to the groove 15, and that the screws 17 extend into the bottom of the groove 15, to engage the pins 12, in case the stylus bar is moved too far in either direction. That is the pins 12 assisted by the points 13 engaging the kerfs 18 in the screws 17 limit the lateral movement of the stylus bar. The stylus bar is thus mounted parallel with the diaphragm, and is supported by pointed pins above and below, to give it the greatest possible freedom of movement. A small washer 26 of thin but tough paper is interposed between the screw 17 and the surface 16 of the fulcrum, in

order that it may yield enough to permit the kerfs 18 to occupy a position parallel to the stylus bar, and also to assist in preventing the transmission of mechanical noises.

It will be noticed that the base or back plate 8 is made of two plates of metal of unlike composition, the inner, which is somewhat thicker, being hard brass, and the outer of bronze. These plates are soldered together, and assist greatly in producing a softer, less metallic, and more agreeable tone.

The top of the set screw 11 is provided with a jeweled point 27, ground to properly track in the grooves of records of the perpendicularly undulating type, requiring a jeweled stylus. The stylus bar is also threaded into the opening 10 to allow jeweled thumb screw 11 to screw into same, and may be used thus, with the reproducer in a vertical position. When it is screwed into side of the stylus bar, it may be used with the diaphragm of the reproducer facing and parallel to the record. The object is to provide a jeweled thumb screw, thus dispensing with the use of a jeweled needle for records of the above type, and also to serve as a thumb screw for holding changeable styli when using records of the type requiring them.

I claim:

1. In a reproducer, the combination with the casing and the diaphragm, of a stylus bar extending parallel with the diaphragm and having an angular portion connected with the center thereof, said stylus bar having a transverse fulcrum at the edge of the casing, brackets secured to the edge of the diaphragm casing at opposite sides of the stylus bar, said brackets being adjustable toward and from each other and each having a portion overlying the adjacent end of the fulcrum in spaced relation, said fulcrum having a slightly V-shaped groove on its under side and having set screws threaded through the ends of the fulcrum and extending into the grooves and having kerfs in their heads extending transverse to the

V-shaped groove, pointed bearing pins threaded through the brackets and engaging the narrow kerfs in the heads of the screws and knife edge bearing pins threaded through the diaphragm casing and engaging the V-shaped groove at the inner sides of the screws.

2. In a reproducer, the combination with the casing and the diaphragm, of a stylus bar extending parallel with the diaphragm and connected therewith, said stylus bar having a transverse fulcrum at the edge of the casing, brackets secured to the edge of the diaphragm casing at opposite sides of the stylus bar, each bracket having a portion overlying the adjacent end of the fulcrum in spaced relation, said fulcrum having a slightly V-shaped groove on its under side and kerfs at the ends of its upper side and transverse to the first-mentioned groove, pointed bearing pins in connection with the brackets and engaging the kerfs, and knife edge bearing pins in connection with the diaphragm casing and engaging the first-mentioned V-shaped groove.

3. In a reproducer, the combination with the casing and the diaphragm, of a stylus bar extending parallel with the diaphragm and connected therewith, said stylus bar having a transverse fulcrum at the edge of the casing, said fulcrum having a slightly V-shaped groove on its under side and kerfs at the ends of its upper side and extending transversely to the first-mentioned groove, and pointed bearing pins supported by the casing and engaging the grooves and kerfs.

4. In a reproducer, the combination of a casing and the diaphragm of a stylus bar extending parallel with the diaphragm and mounted to swing on the casing, said casing consisting of a ring and a base, the base being composed of two superposed and connected plates having different coefficients of expansion.

5. In a reproducer, a casing consisting of a ring and a base, the base being composed of two plates having different coefficients of expansion, superposed and connected.

WILLIAM TROUPE LAKIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RECORD FOR TALKING MACHINES.

1,246,851 ----- A. N. Petit, Dec'd.

Patented Nov. 13, 1917.

Filed Feb. 13, 1914, Renewed Apr. 14, 1917

A. N. PETIT, DEC'D.
A. O. PETIT, ADMINISTRATOR.
RECORD FOR TALKING MACHINES.

APPLICATION FILED FEB. 12, 1914. RENEWED APR. 14, 1917.

1,246,651.

Patented Nov. 13, 1917.

Fig. 1

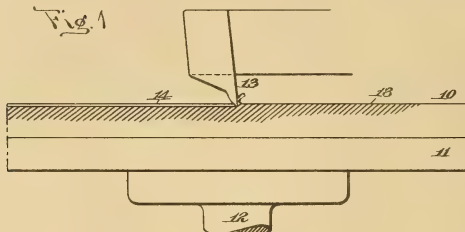


Fig. 2



Fig. 3

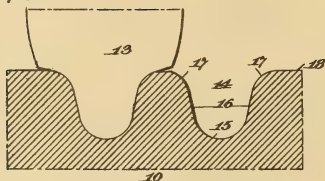


Fig. 4

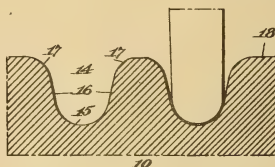


Fig. 5

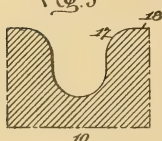


Fig. 6

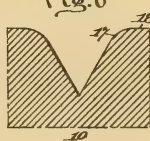


Fig. 7

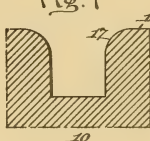


Fig. 8

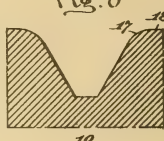


Fig. 9



Witnesses:

John L. Lotech
Elijah F. Munn, Jr.

Inventor
Adenor N. Petit, Decd.,
Albert O. Petit, Administrator.
Waldob. Morse,
Attorney.

UNITED STATES PATENT OFFICE.

ADEMOR N. PETIT, OF ORANGE, NEW JERSEY; ALBERT O. PETIT, ADMINISTRATOR OF SAID ADEMOR N. PETIT, DECEASED, ASSIGNOR TO JOHN L. LOTSCH, TRUSTEE, OF BROOKLYN, NEW YORK.

RECORD FOR TALKING-MACHINES.

1,246,651.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed February 12, 1914, Serial No. 818,349. Renewed April 14, 1917. Serial No. 162,144.

To all whom it may concern:

Be it known that I, ADEMOR N. PETIT, a citizen of the United States, residing at Orange, county of Essex, and State of New Jersey, have invented a certain new and useful Record for Talking-Machines, of which the following is a specification.

My invention relates to records of the type wherein a sinuous groove of substantially uniform depth, is cut into a tablet which is caused to rotate beneath a cutting tool of the proper shape and configuration, and its object is to produce an improved record groove, the walls of which are so proportioned and shaped as to reproduce the sounds which were employed to produce the original record, with more clearness and distinctness than has been possible from records heretofore devised.

Another object is to produce a record groove which will retain its shape and reproduce the recorded sounds with fidelity and without false tones.

A further object is to produce a record groove wherein the reproducing tool will always properly engage the record surface notwithstanding the wear to which the tool may be subjected.

These and further objects will more fully appear in the following specification and accompanying drawings taken together or separately.

Numerous patents have been granted on records having grooves of various configurations. The earliest form was that traced on a smooth surface covered with carbon dust. This dust was displaced and left a shallow groove in the carbon. The next step was the production of a groove by indenting in a metal foil or in wax or by the concurrently devised method of tracing through a wax film deposited upon metal and then etching; then followed a cutting tool which formed a groove with sloping walls and a flat bottom similar to a standard screw thread. Then followed a shallow round bottomed groove cut in relatively hard material. This was followed by grooves of semi-elliptical shape and of considerable depth. Then came the V shaped groove. These forms are mentioned as commercially developed but in fact the early experimenters tested many thereof concurrently, being limited only by their several choices of material. Various

other forms of record grooves have been suggested but all of them are along the same general lines as those noted above.

In all of the record grooves with which I am familiar the walls of the groove terminate at the plane of the record surface in sharp angles and form sharp and consequently thin fragile edges. The sharp thin edges are, because of the nature of the material of which records are composed, more or less ragged or what is known in cutting tools as "wire edged," and the rough edges produce false vibrations even upon the first use of the record. The fact that the edges of the grooves are ragged causes them to crumble and disintegrate by reason of the friction of the reproducing stylus against them and in a comparatively short time the edges are broken down and the effect of the false vibrations induced by them is greatly increased. The rough edges of the groove also act as grinding surfaces against which the stylus is held and consequently it is soon worn to such an extent that shoulders are formed, which shoulders rest upon the surface of the disk and further tend to produce discordant sounds. This grinding action on the stylus or needle is so rapid that in most cases, before the needle reaches the end of the record groove on its first reproduction the same is clearly noticeable and the nearer to the end of the groove the needle approaches the greater the wear on the needle and the record and the more apparent becomes the distortion of the sound reproduction.

By means of my improved record the objectionable features above described will be completely eliminated and this advantage is obtained by so fashioning and forming the record groove that the side walls will not join the plane of the record surface at angles, but will merge into that surface by easy curves thereby eliminating the sharp angles with their consequent weakened and friable edges. The cutting tool for forming my improved record groove is not claimed herein, but is made the subject matter of a separate application filed on even date herewith.

In the drawings—

Figure 1 is a sectional view of a portion of a talking machine showing a recording tool in operative relation thereto.

Fig. 2 is a sectional view of the same, taken at right angles to Fig. 1.

Fig. 3 is an enlarged sectional view of a record groove and cutting tool.

Fig. 4 is a similar view of the groove showing a reproducing stylus of ordinary construction engaging with the groove.

Figs. 5, 6, 7 and 8 are sectional views of modified forms of groove.

Fig. 9 is an enlarged plan view of a portion of the record groove.

In all of the above views corresponding parts are represented by the same reference characters.

A suitable blank 10 made of any preferred material is carried on a turntable 11 which is mounted on the shaft 12 of a motor capable of rotating the blank. 13 represents a cutting tool which may be connected with an ordinary recording diaphragm in the usual manner. The cutting tool is arranged perpendicularly to the surface of the blank.

When the blank is placed in position on the turntable and the recorder is adjudged in proper position, the cutter will engage the blank and, when the same is rotated against the cutting edge and slowly moved diametrically under the cutting tool, a spiral groove of the required, uniform depth will be cut in the blank. If now the diaphragm be vibrated, by atmospheric compressions or sound waves impinging thereon, the recording tool will be moved from side to side and the groove or record instead of being a true spiral will be a sinuous groove extending spirally over the surface of the blank.

The preferred form of my improved record groove 14 is shown particularly in Figs. 3 and 4. The groove is trough shape with a rounded bottom 15, and diverging walls 16. The upper parts of the walls are curved as at 17 and these curves merge into the flat surface 18 of the disk 10. The record so made is used as a master for the production of a matrix and from this any number of hard reproducing records.

When reproducing, the stylus in traversing the record groove will bear against both sides thereof in being fed across the surface of the disk and will bear against a rounded and relatively long surface instead

of bearing against a thin sharp edge as heretofore, and the rounded portions being part of the record of the sound vibrations, the reproductions will be true, due to the rounded edges of the groove; and both record and stylus will wear and remain serviceable much longer.

It is obvious that various modifications may be made without departing from the object of my invention.

It is to be understood that I do not limit myself to a disk record and it is obvious that the invention herein described and disclosed is equally applicable to the cylindrical and other types of record.

In accordance with the provisions of the patent statute, I have now described my invention together with the apparatus which I consider to represent the best embodiment thereof, but I desire it to be understood that the apparatus is merely illustrative and that my invention is not to be so limited, but may be carried out in other ways.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. A sound record having a laterally undulatory cut groove of substantially uniform depth, the walls of said groove merging into the surface of the record.

2. A sound record having a laterally undulatory cut groove of substantially uniform depth, and curved surfaces joining the walls of the groove to the surface of the record.

3. A sound record having a laterally undulatory cut groove of substantially uniform depth, the walls of said groove diverging from the bottom thereof and merging into the surface of the record.

4. A sound record having a laterally undulatory cut groove of substantially uniform depth, the walls of the groove diverging from the bottom thereof and joining the surface of the record by easy curves.

This specification signed and witnessed this 11th day of February, 1914.

ADEMOR N. PETIT.

Witnesses:

JOHN L. LOTSCH,
ELIJAH F. MUNN, Jr.

CUTTING TOOL FOR SOUND-RECORDING MACHINES.

1,246,652 ----- A. N. Petit, Dec'd.
Patented Nov. 13, 1917.
Filed Feb. 12, 1914, Renewed
Apr. 14, 1917.

A. N. PETIT, DEC'D.

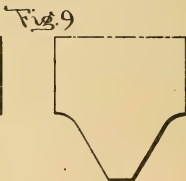
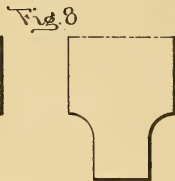
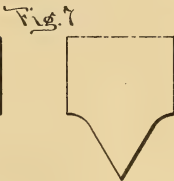
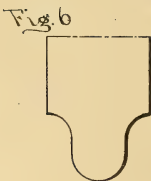
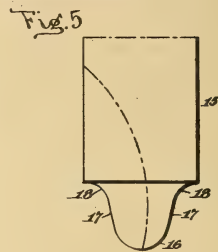
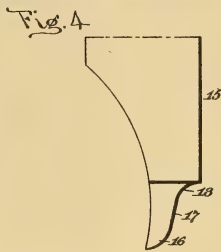
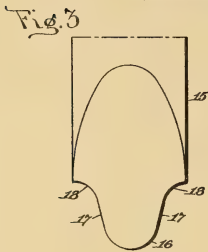
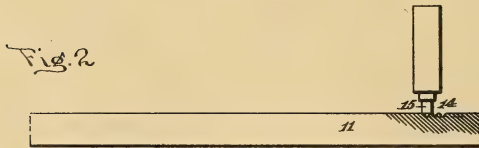
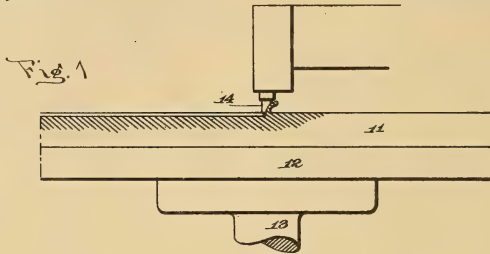
A. O. PETIT, ADMINISTRATOR.

CUTTING TOOL FOR SOUND RECORDING MACHINES.

APPLICATION FILED FEB. 12, 1914. RENEWED APR. 14, 1917.

1,246,652.

Patented Nov. 13, 1917.



Witnesses:

John L. Lottick
Elijah F. Munns, Jr.

Adenor N. Petit, Dec'd.
Albert O. Petit, Administrator.
Waldo L. Morse,
Attorney.

UNITED STATES PATENT OFFICE.

ADEMOR N. PETIT, OF ORANGE, NEW JERSEY; ALBERT O. PETIT, ADMINISTRATOR OF SAID ADEMOR N. PETIT, DECEASED, ASSIGNOR TO JOHN L. LOTSCH, TRUSTEE, OF BROOKLYN, NEW YORK.

CUTTING-TOOL FOR SOUND-RECORDING MACHINES.

1,246,652.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed February 12, 1914, Serial No. 818,350. Renewed April 14, 1917. Serial No. 162,143.

To all whom it may concern:

Be it known that I, ADEMOR N. PETIT, a citizen of the United States, residing at Orange, county of Essex, and State of New Jersey, have invented a certain new and useful Improvement in Cutting-Tools for Sound-Recording Machines; of which the following is a specification.

My invention relates to tools for cutting the record grooves in records of the lateral type wherein a sinuous groove of substantially uniform depth is cut into a disk or tablet rotated beneath and in engagement with a cutting tool which is held stationary relatively to the rotative movement of the disk or tablet, and which moves laterally with respect to the motion of the disk so that a spiral groove may be cut in the surface of the disk. When the cutting tool is properly attached to the diaphragm of a sound recording machine and said diaphragm is vibrated, the cutting tool is moved laterally by the sound waves and a sinuous groove is cut, and this sinuous groove is disposed in a spiral or helix on the surface of the disk or tablet.

In all previous cut or traced records the groove has been made of V shape, U shape, semi-elliptic shape, semi-circular arc shape, or with a flat or rounded bottom having diverging walls. All of these forms are alike in one respect, the walls adjoin the record surface at a sharp angle to the latter and produce a thin, sharp, fragile, edge which cannot be made smooth, as is highly desirable in a talking machine record, and which edge from the nature of the material used in the manufacture of such articles, will be very quickly broken off, thereby exciting false vibrations in the reproducing stylus and diaphragm and producing discordant sound vibrations.

The object of my invention is to provide a cutting tool for shaping grooves suitable for use in talking machine records and to so proportion and form the tool that the resulting record groove will be of such a shape that all sharp, thin edges will be eliminated and a smooth curved wall from the bottom of the groove up to and merging into the surface of the record, will be secured. The form of record groove produced by the use of my improved cutting tool is not claimed herein, but is made the subject

of a separate application filed on even date 55 herewith.

This and further objects will more fully appear from the following specification and the accompanying drawings taken together or separately.

In the drawings:

Figure 1 is a sectional view of a portion of a recording machine, showing a cutting tool in operative connection therewith.

Fig. 2 is a sectional view of the same, taken at right angles to Fig. 1.

Fig. 3 is a greatly enlarged sectional view of the preferred form of cutter.

Fig. 4 is a side view of the cutting tool.

Fig. 5 is a side view of the stock from which the tool is produced.

Figs. 6, 7, 8 and 9 are front views of modified forms of cutters.

In all of the above views corresponding parts are designated by the same reference 75 characters.

A suitable blank disk or tablet 11 made of any well-known or preferred material is carried on a turntable 12 which is mounted on the shaft 13 of a motor suitable to rotate the blank and cause relative lateral movement of the blank and a cutting tool 14 which may be suitably connected to an ordinary recording diaphragm so that it will be given a sidewise motion by the vibrations of the diaphragm while the blank is revolving beneath it and it is being fed laterally across the face of the blank.

The preferred embodiment of my preferred cutting tool is shown in Figs. 3 and 4. 15 represents a cylindrical body having one end turned down to nipple form, that is, having an axial projection with a rounded apex 16 and flaring sides 17 which merge into the end of the cylinder by means of a curve 18. A portion of the cylinder is cut away at one side to a point a short distance beyond the medial line, as shown by the dotted line in Fig. 5. By cutting away the stock as described a tool of the shape shown in Figs. 3 and 4 will be produced, and such a tool will cut a groove of the same shape as the nipple shaped projection.

It is obvious that various modifications may be made without departing from the spirit or scope of my invention.

It is to be understood that I do not limit myself to a disk record and it is obvious that

the invention herein described and disclosed is equally applicable to the cylindrical and other types of record.

In accordance with the provisions of the patent statutes I have now described my invention together with the apparatus which I consider to represent the best embodiment thereof, but I desire it to be understood that the apparatus is merely illustrative and that the invention is not to be understood to be so limited, and that the invention can be carried out in other ways.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. A cutting tool for sound recording machines having a cutting edge which merges into a line on the plane of the surface to be acted on.
2. A cutting tool for sound recording machines having its cutting edges merging into a line on the plane of the surface to be acted on.
3. A cutting tool for sound recording machines having diverging edges, said edges merging into a line on the plane of the surface to be acted on.
4. A cutting tool for sound recording machines having a rounded extremity and

edges merging into a line on the plane of the surface to be acted on.

5. A cutting tool for sound recording machines having a rounded extremity, and flaring edges, said edges merging into a line on the plane of the surface to be acted on.

6. A cutting tool for sound recording machines having cutting edges which are rounded into a line on the plane of the surface to be acted on.

7. A cutting tool for sound recording machines having diverging edges, said edges being rounded into a line on the plane of the surface to be acted on.

8. A cutting tool for sound recording machines having a rounded extremity and sides rounded into a line on the plane of the surface to be acted on.

9. A cutting tool for sound recording machines having a rounded extremity, and flaring sides, said sides being rounded into a line on the plane of the surface to be acted on.

This specification signed and witnessed this 11th day of February, 1914.

ADEMOR N. PETIT.

Witnesses:

JOHN L. LOTSCH,
ELIJAH F. MUNN, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPHY NEEDLE.

1,248,894 ----- F. L. Wood,
Patented Nov. 13, 1917.
Filed June 30, 1915.

F. L. WOOD.
PHONOGRAPH NEEDLE.
APPLICATION FILED JUNE 30, 1915.

1,246,694.

Patented Nov. 13, 1917.

Fig. 1,



Fig. 2,

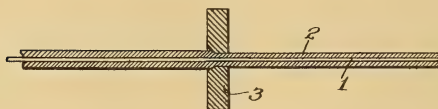


Fig. 3,

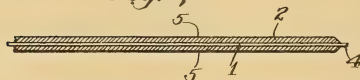


Fig. 4,



Fig. 5,



INVENTOR
Fredrick L. Wood
BY
Edw. Scherr
ATTORNEYS

UNITED STATES PATENT OFFICE.

FREDERICK L. WOOD, OF MERIDEN, CONNECTICUT, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

PHONOGRAPH-NEEDLE.

1,246,694.

Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed June 30, 1915. Serial No. 37,228.

To all whom it may concern:

Be it known that I, FREDERICK L. WOOD, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Phonograph-Needles, of which the following is a specification.

My present invention relates to a novel phonograph needle for use in reproducing sound from sound-records. The advantages of my said needle will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings. In the latter, Figures 1 to 4 inclusive are more or less diagrammatic representations of different stages in the process; and Fig. 5 is a mid-longitudinal section of the finished needle shown in Fig. 4.

In carrying out the invention, I may use for materials a six to eight foot length or so of piano wire having a diameter of about six or seven thousandths of an inch assuming that the needle is to be used to play the lateral cut records generally in use today; also a length of brass or steel tubing about eighty thousandths of an inch in diameter. The tubing may be shorter than the wire because it will extend farther than the wire in the hereinafter described drawing operation. The hole through the tubing is small so that it nicely receives the wire into it. The wire having been inserted entirely through the tubing, the two are brought into union with each other by being subjected to a wire-drawing operation. In Fig. 1, the wire is designated 1 and is shown located inside the tubing 2 preparatory for the drawing operation. In Fig. 2, 3 is the wire-drawing die. The sheath and wire to the right of the die are supposed to have been drawn through it. They are reduced in diameter, elongated and drawn into perfect union with each other. The wire thus becomes perfectly integrated with the sheath to the great benefit of the tonal qualities of the resulting needle. The piano wire is hard to start with; and the metal tubing becomes so, due to the drawing operation, with the result that it is given a finely resonant and other qualities, especially adapting the composite wire for phonograph needles. To this end, annealing is avoided in connection with the

drawing operation or operations. The brass sheath gives a softer playing needle than the steel.

The next step in the manufacture of the needle will be preferably to mill one end of the composite wire to the extent of removing part of the sheath to expose enough of the wire for a record-groove engaging point. This is shown in Fig. 3 where the point is designated 4. Both sheath and wire will then be cut through on the line 5—5 in Fig. 3 to produce the final needle. The result of this step is shown in Fig. 4. The same milling and cutting off operations will then be repeated on the remaining free-end portion A Fig. 4 and so on until the whole length of the composite sheathing and wire is formed into needles.

The tonal quality of these needles is excellent; and their hard drawn piano-wire points are tough, non-breaking, very smooth and uniform in action, and capable of playing a great many records per needle.

Of course, it is possible that certain steps could be practised in the reverse order and other changes might be made in the process or the materials which would still be within the spirit and intent of my invention and these I mean to be covered by the claims.

I prefer to choose my material for the sheath so that after the final drawing operation it will still be sufficiently softer than the piano-wire that a milling tool can be chosen which will cut the sheath to expose the wire-point without cutting the point, this selective action of the tool making it easy and practical to expose said points.

What I claim is:—

1. A phonograph needle comprising a metal sheath filled with a wire, the two having a drawn union with each other, one end of the wire being exposed for a short distance to form the record engaging point.

2. A phonograph needle comprising a metal sheath filled with a wire, the two having a drawn union with each other, said needle having a record engaging point at its end.

In testimony whereof, I have signed my name to this specification this 29th day of June 1915.

FREDERICK L. WOOD.

TALKING MACHINES.

1,346,763 ----- L. J. Lussier.

Patented Nov. 13, 1917.

Filed Nov. 29, 1913.

L. LUMIERE.
TALKING MACHINE.

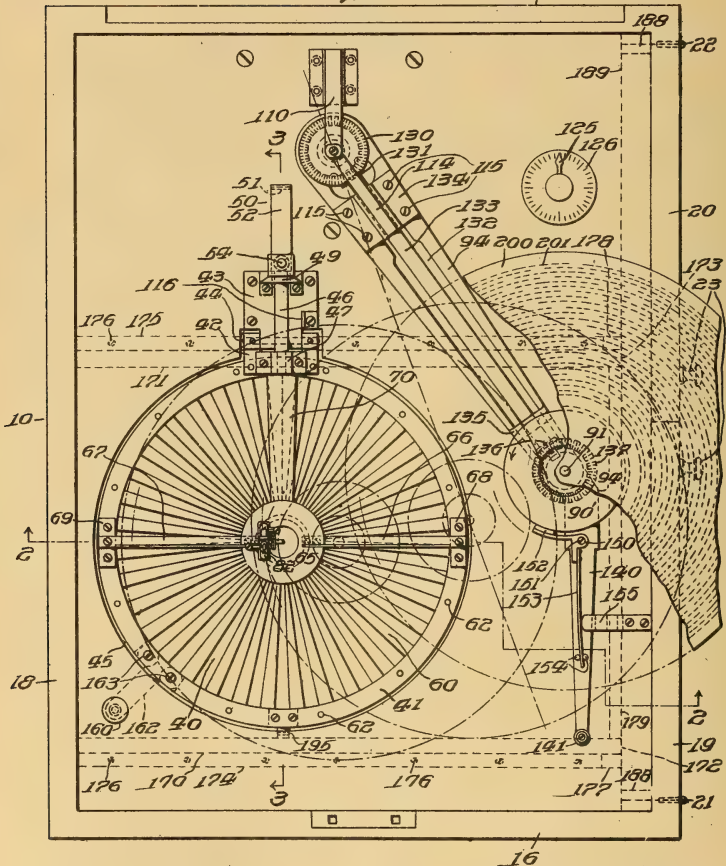
APPLICATION FILED NOV. 29, 1913.

Patented Nov. 13, 1917.

6 SHEETS—SHEET 1.

1,246,763.

Fig. 1.



INVENTOR
Louis Lumiere.

WITNESSES

H. J. Hartmann.
A. J. Gardner.

BY

Harold R. H.

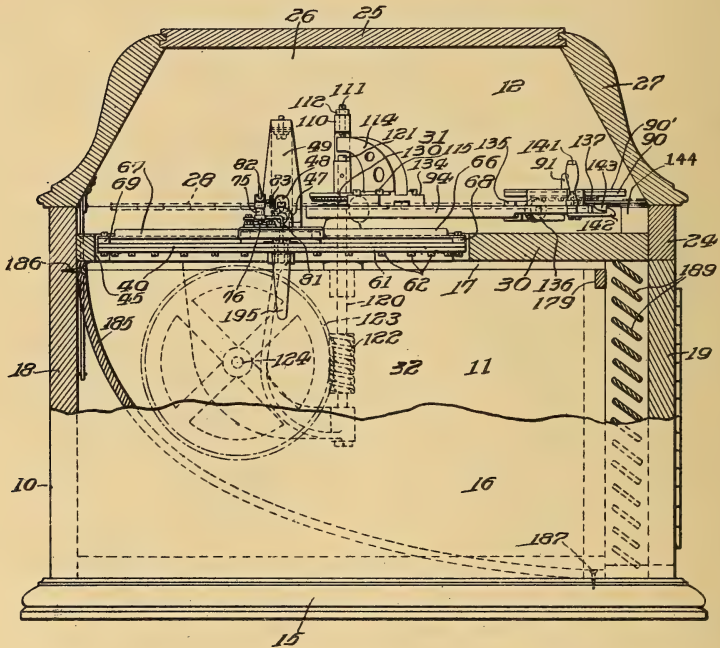
ATTORNEY

L. LUMIERE.
TALKING MACHINE.
APPLICATION FILED NOV. 29, 1913.

1,246,763.

Patented Nov. 13, 1917.
6 SHEETS—SHEET 2.

Fig. 2.



WITNESSES
F. J. Hartman.
A. J. Gardner.

BY

INVENTOR
Louis Lumiere.
Grace K. H.

ATTORNEY

1,246,763.

Fig. 3.

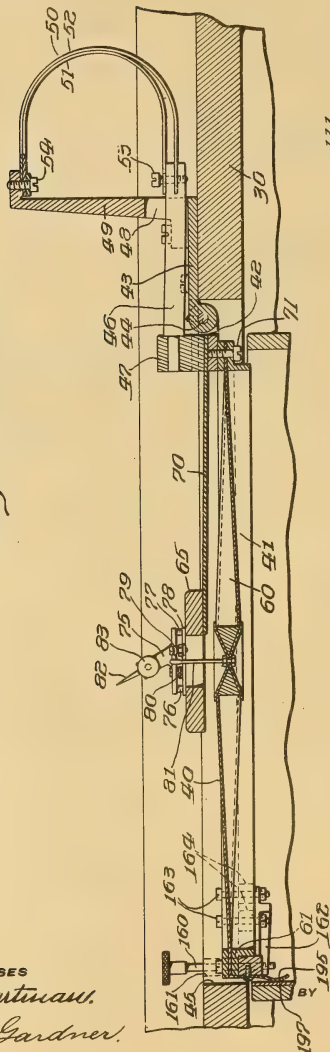
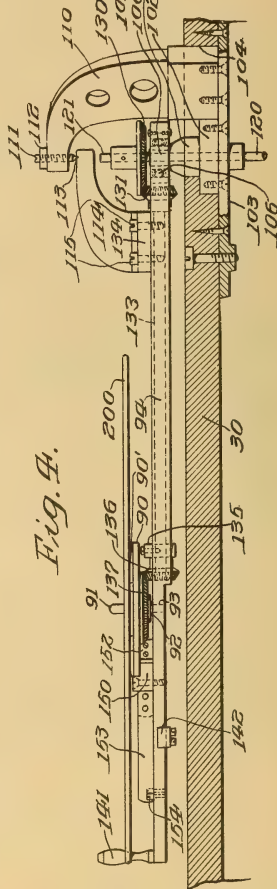


Fig. 4.



WITNESSES
H. J. Hartmann.
A. J. Gardner.

Louis Lumiere.

Handwritten signature

ATTORNEY

L. LUMIERE.
TALKING MACHINE.

APPLICATION FILED NOV. 29, 1913.

Patented Nov. 13, 1917.

6 SHEETS—SHEET 4.

1,246,763.

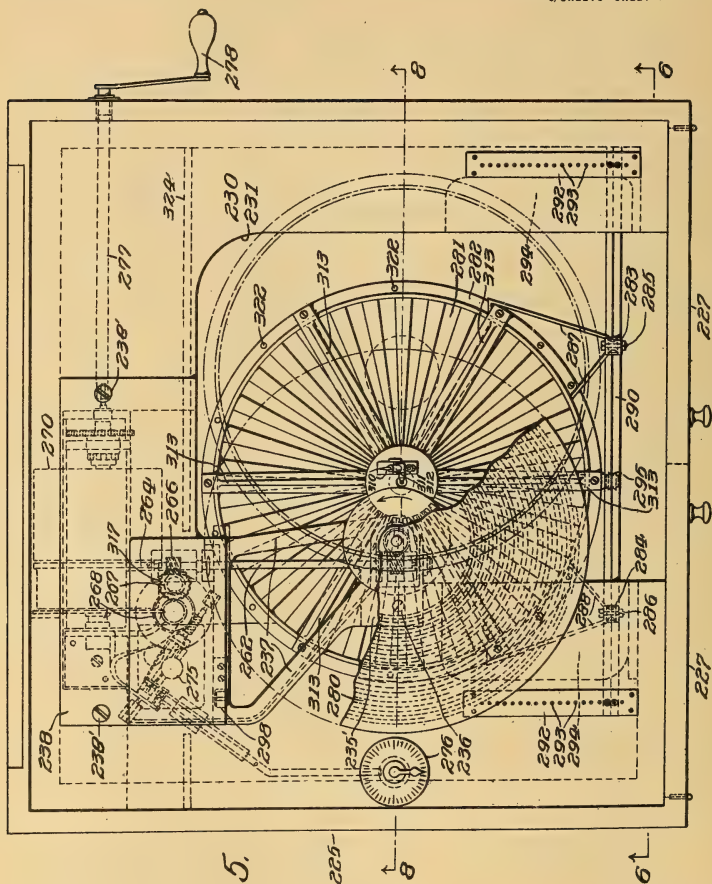


Fig. 5.

WITNESSES

W. J. Hartman.
A. J. Gardner.

BY

Louis Lumiere.

Harold H.

INVENTOR

ATTORNEY

L. LUMIERE.
TALKING MACHINE.

APPLICATION FILED NOV. 29, 1913.

Patented Nov. 13, 1917.

6 SHEETS—SHEET 5.

1,246,763.

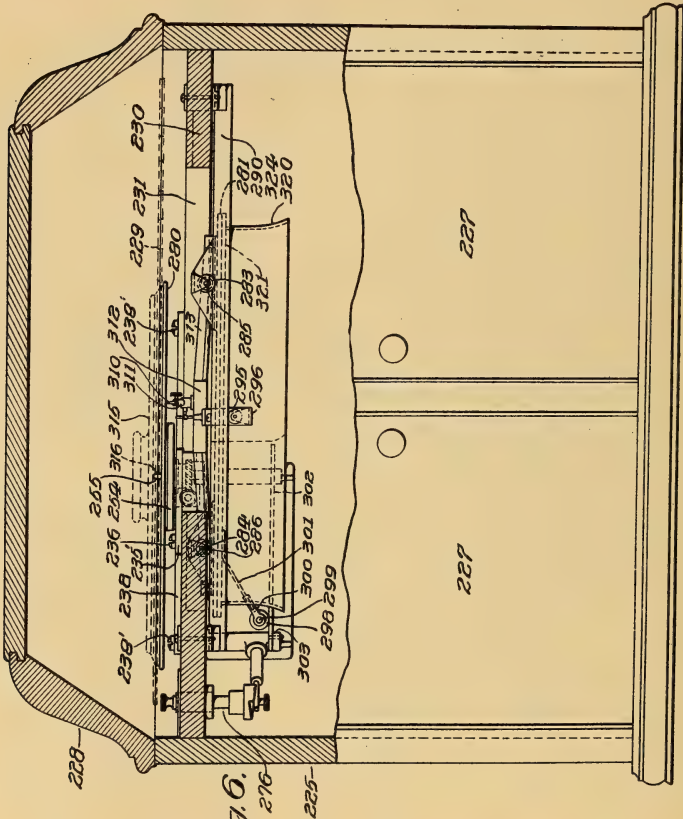


Fig. 6.

WITNESSES
H. J. Hartman.
A. J. Gardner.

BY

INVENTOR
Louis Lumiere.
Grace Pettit

ATTORNEY

L. LUMIERE.
TALKING MACHINE.

APPLICATION FILED NOV. 29, 1913.

Patented Nov. 13, 1917.

6 SHEETS—SHEET 6.

1,246,763.

Fig. 7.

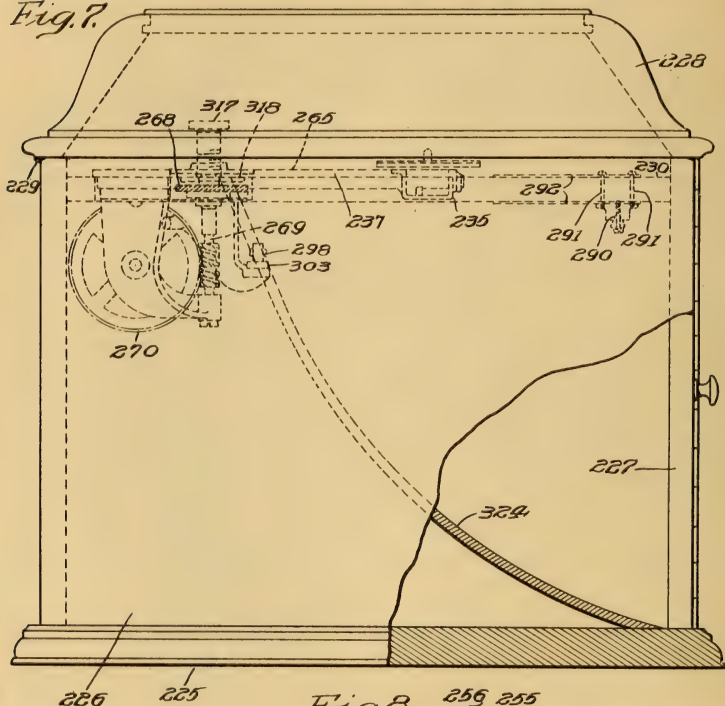
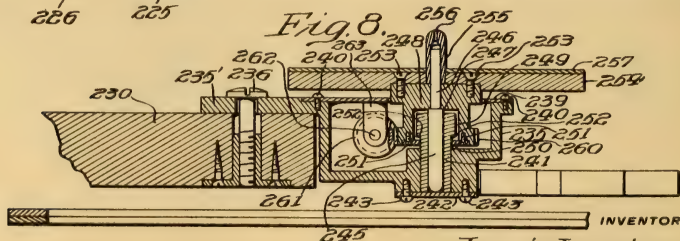


Fig. 8.



Louis Lumiere.

WITNESSES

H. J. Hartmann.
A. J. Gardner.

BY

Harce Pelt

ATTORNEY

UNITED STATES PATENT OFFICE.

LOUIS LUMIERE, OF LYON, FRANCE, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TALKING-MACHINE.

1,246,763.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed November 29, 1913. Serial No. 803,697.

To all whom it may concern:

Be it known that I, LOUIS LUMIERE, a citizen of France, and a resident of the city of Lyon, France, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

The main objects of this invention are to provide an improved talking machine including a cabinet, sound reproducing means including a comparatively large vibratory diaphragm inclosed in the cabinet, and sound amplifying means inclosed in the cabinet and arranged to cooperate directly with the diaphragm; to provide improved means for supporting a diaphragm in position to cooperate with a sound record; to provide improved means for supporting and rotating a sound record in cooperation with sound reproducing means; to provide improved means for holding a rotary record support against rotation; to provide improved sound reproducing means; and to provide other improvements as will appear hereinafter.

In the accompanying drawings Figure 1 is a fragmentary top plan view of a talking machine constructed in accordance with this invention; Fig. 2 a fragmentary end elevation partly in vertical transverse section on line 2-2 of Fig. 1; Fig. 3 a fragmentary vertical section on line 3-3 of Fig. 1; Fig. 4 a fragmentary side elevation of a portion of the machine shown in Fig. 1; Fig. 5 a fragmentary top plan view of a modified form of this invention; Fig. 6 a fragmentary front elevation partly in vertical transverse section on line 6-6 of Fig. 5; Fig. 7 a fragmentary side elevation partly in vertical section of the machine shown in Figs. 5 and 6; and Fig. 8 an enlarged fragmentary vertical section on line 8-8 of Fig. 5.

Referring to the drawings, particularly to Figs. 1 to 4 inclusive, one embodiment of this invention comprises a talking machine including an exterior casing 10, consisting of an oblong rectangular body portion 11, and a hollow cover 12 superimposed thereon and movable with respect thereto. The body portion 11 includes an oblong rectangular rigid bottom wall 15, vertical end walls 16

and 17, and a vertical side wall 18, rigid with and projecting upwardly from the bottom wall 15, and vertical doors 19 and 20 hinged as at 21 and 22 respectively to the end walls 16 and 17 to open outwardly, the doors being provided with knobs 23 for their convenient operation. Arranged above and in vertical alinement with the doors 19 and 20, when they are closed, is a horizontal strip 24 connecting the upper portions of the end walls 16 and 17. The cover 12 includes a substantially flat horizontal top wall 25 and downwardly diverging end walls 26 and side walls 27. The rear end wall 26 of the cover is connected by hinges 28 to the corresponding end wall 17 of the body of the cabinet to permit the cover to be swung about the hinges 28 as an axis.

Within the body portion 11 of the casing 10 is a rigid horizontal partition 30 which is spaced slightly below the upper edges of the body portion 11 and in a plane slightly above the upper edges of the doors 19 and 20. This partition 30 which extends from the end wall 16 to the opposite end wall 17 and from the side wall 18 to the opposite side wall 24 is rigidly secured in position with respect to these walls and divides the interior of the cabinet 10 into an upper compartment 31 and a lower compartment 32.

For reproducing sounds there is provided a comparatively large circular diaphragm 40, which is carried by a flat annular substantially rigid metal frame 41 concentric therewith, which is pivotally connected to the partition 30 by a hinge comprising two leaves or hinge members 42 and 43, one of which is rigidly secured to the frame 41, and the other of which is rigidly secured to the upper surface of the partition 30, the leaves being pivotally connected by the horizontal pintle 44, the longitudinal axis of which is substantially in plane with the upper surface of the partition 30. The annular frame 41 is arranged to oscillate in a circular aperture 45 concentric therewith and provided therefor in the partition 30, the aperture 45 being slightly larger in diameter than the frame so that the frame may oscillate about the longitudinal axis of its pintle 44 without coming into contact with the walls of the aperture.

For yieldingly maintaining the diaphragm 40 and its frame 41 in a predetermined plane, a rod 46 is rigidly secured at one end in a bracket 47 rigidly secured to the upper 5 surface of the leaf 42 and projects rearwardly slightly above the leaf 43. The rear end of the rod 46 projects loosely through an oblong slot 48 provided therefor in the lower end of a vertical bracket 49, the lower 10 end of which is rigidly secured to the leaf 43. A normally bow shaped spring 50 consisting of two thin substantially U-shaped strips 51 and 52 of steel is rigidly secured at one end to the rear end of the rod 46 by 15 means of a screw 53 and is rigidly secured at its other end to the upper end of the bracket 49 by means of a screw 54.

The spring 50 normally maintains the annular frame 41 in a plane parallel to and 20 slightly below the longitudinal horizontal axis of the pintle 44 and inclined slightly upwardly in a forward direction, the frame 41 and its diaphragm 40 being substantially in the plane of the horizontal partition 30, 25 and almost entirely filling or closing the circular aperture 45 in the partition 30.

The diaphragm 40 may be of any suitable construction, but is preferably made in accordance with my invention as described 30 and claimed in United States Patents Nos. 986,477 and 1,036,529, granted March 14, 1911, and August 20, 1912, respectively, and preferably comprises an oblong strip of material which is suitably folded or plaited 35 and which has its ends secured together to form a plurality of radial folds or plaits 60. The marginal portion of the diaphragm 40 is substantially flat and is clamped against the under flat surface of 40 the annular frame 41 by means of a comparatively rigid metallic annulus 61, which is secured to the frame 41 by means of screws 62 extending through the annulus and the marginal portion of the diaphragm and 45 threaded into the frame.

For vibrating the diaphragm 40 in accordance with a sound record, there is arranged slightly above the central portion of the diaphragm, and coaxially therewith and substantially parallel thereto, a flat rigid annular metal base 65. The base 65 is held 50 in a substantially fixed position with respect to the frame 41 by means of two oppositely disposed radial metal arms 66 and 67, the inner ends of which are rigidly secured to the base 65, and the outer ends of which are rigidly secured respectively to two 55 blocks 68 and 69, which are rigidly secured to the upper surface of the frame 41, and 60 by means of a flat radial metal arm 70, one end of which is rigidly secured to the under surface of the base 65, and the other end of which extends in a recess provided therefor in the under surface of the bracket 47 65 and is rigidly clamped in position against

the bracket by means of a set screw 71, extending upwardly through the annulus 61, the marginal portion of the diaphragm, the frame 41, and the leaf 42, and engaging at its upper end against the under surface of 70 the arm 70. Arranged above the base 65 is a stylus bar 75, which is mounted to oscillate about an axis substantially fixed with respect to the arm 70 and parallel thereto, upon spaced knife edges 76 and 77, rigid 75 with a flat plate 78 mounted upon and rigidly secured to the base 65. The stylus bar 75 is preferably yieldingly connected to the plate 78 by oppositely disposed springs 79 and 80, and is operatively connected to the central portion of the diaphragm 40 by a slightly yielding rod 81. 80 The axis of oscillation of the stylus bar 75 is spaced laterally from the rod 81 and the stylus bar is inclined upwardly in a normally substantially vertical plane from its axis of oscillation, and is provided at its upper end, and coaxially therewith, with a removable stylus 82 which engages in a suitable socket provided therefor in the end of 90 the stylus bar, and which is clamped in position by means of a set screw 83. The construction of the stylus bar is such that when the stylus 82 is given a lateral oscillation, the diaphragm 40 will be vibrated vertically. 95

For supporting a disk sound record in a horizontal plane to swing in a substantially horizontal plane about a substantially vertical axis spaced from the center of the record, and for simultaneously rotating the 100 record about a vertical axis extending through its center, means are provided including a substantially flat horizontal turntable 90 which is spaced above the horizontal partition 30, and is arranged to swing in a plane which is slightly above the horizontal partition 30 and is arranged 105 to swing in a plane which is slightly above the upper end or point of the stylus 82 110 when the stylus is in an inoperative position as shown in Figs. 1 and 3. The upper surface of the turntable may be partially covered with a flat annulus 90' of rubber or other material suitable to give a proper frictional contact between the turntable and the record. 115

The turntable 90 is in this device much smaller than the turntables usually used with talking machines, as in this instance 120 the turntable is arranged to cooperate with a record superimposed thereon and arranged with its recorded or active side facing downwardly, or in other words, with a record which is inverted from the ordinary position. In the present instance the turntable 90 is therefore preferably made with a diameter approximately the same as the diameter of the label which is usually found 125 in the center of a disk record, so that the 130

diameter of the turntable will be no greater than the diameter of the central unrecorded portion of the record, and will permit the stylus to travel beneath the record and over the downwardly facing recorded portion thereof without coming into contact with the turntable.

The turntable 90 is rigidly secured to a comparatively short vertical spindle 91 which projects centrally therethrough, and the lower end of which is slightly reduced in diameter to form an annular downwardly facing shoulder 92, and is mounted to rotate freely in a suitable aperture 93 provided therefor in a substantially horizontal metal arm 94, the spindle 91 being held by the annular shoulder 92 against downward movement with respect to the arm 94.

The arm 94 is supported at one end by the upper cylindrical end 100 of a vertical stud 101, the lower end of which projects upwardly from and is preferably integral with a base 102, which rests upon and is rigidly secured to a substantially flat motor support 103 which is rigidly secured against the under surface of the horizontal partition 30, the base 102 and the stud 101, being arranged in a suitable aperture 104 provided therefor in the arm 94. Suitable ball bearings 106 are provided between the stud 101 and the arm 94 to permit the arm to be oscillated freely in a horizontal plane about the stud 101, and to prevent downward movement of the arm 94. Coöperating with the stud 101 is a fixed bracket 110 which projects upwardly from the base 102 and is rigidly secured thereto. The upper end of this fixed bracket curves forwardly and is provided with a vertical screw 111, which is threaded therethrough in axial alignment with the stud 101, and is held securely in any position of vertical adjustment by the lock nut 112. The lower end of the screw 111 is preferably conical in shape and engages in a corresponding conical recess 113 in one end of a longitudinal curved bracket 114 which extends forwardly and downwardly from the screw and which is rigidly secured at its lower end to the upper surface of the arm 94 by means of screws 115. The conically pointed screw 111 coöperates with the stud 101 in maintaining the swinging arm 94 in a horizontal plane. A fixed stop 116 is arranged to limit the clockwise movement of the arm 94.

For rotating the turntable 90 about its spindle 91 a rotary vertical spindle 120 projects upwardly through the motor support 103, base 102, and stud 101, coaxially with the stud 101 and has a free upper end 121 projecting upwardly above the swinging arm 94 and terminating below the bracket 114. The lower portion of the spindle 120 is provided with a worm 122, coaxial and rigid therewith, which meshes with a worm-

gear 123 arranged beneath the partition 30 to rotate on a horizontal shaft 124 rigid therewith, and which is rotated by any suitable motor (not shown), which may be suspended from the motor support 103, the speed of which may be controlled by any well known mechanism (not shown), adjustable by means of a rotatable indicator 125 coöperating with a suitable dial 126 secured to the upper surface of the partition 30.

For transmitting power from the vertical motor spindle 120 to the vertical turntable spindle 91, a beveled gear 130 is rigidly secured to the upper free end 121 of the spindle 120, and meshes with a corresponding beveled pinion 131 which is arranged in one end of an elongated aperture or slot 132, provided in the swinging arm 94, and extending longitudinally thereof. The pinion 131 is rigidly secured to the inner end of a horizontal rotary shaft 133 which is arranged in the longitudinal slot 132. The shaft 133 extends rotatably through and is supported by two bearings 134 and 135 which bridge the slot 132 and are rigidly secured to the swinging arm 94 at points adjacent the two ends of the shaft 133 respectively. Rigidly secured to the shaft 133, outside of and in engagement with the bearing 135, is a beveled pinion 136, which meshes with a beveled gear wheel 137, which is arranged between the arm 94 and the turntable 90 and which is mounted upon and rigidly secured to the turntable spindle 91.

For conveniently swinging the turntable 90, manually, into and out of an operative position, and for locking the swinging arm 94 in an inoperative position, the outer portion of the swinging arm 94 is provided with a substantially horizontal extension 140, preferably integral therewith, which joins the main portion of the arm 94 at a point beneath the turntable 90, and which extends outwardly from the turntable in a substantially straight line, and terminates at its outer end at a point spaced outwardly from the margin of the largest record which the turntable is intended to support. A suitable handle 141 projects upwardly from the outer end of the extension 140 and is secured thereto in any suitable manner. The extension 140 is arranged obliquely with respect to the main portion of the swinging arm 94, so that when the swinging arm 94 is at the limit of its anti-clockwise movement, the extension 140 will be substantially parallel to the side wall 19 of the exterior cabinet 10. A yielding hook 142 of spring steel or other suitable material is rigidly secured against the under surface of the extension 140 and projects laterally therefrom to coöperate with the corresponding yielding spring hook 143 which is rigidly secured to a block 144 arranged in abutment with

the side wall 24 and resting upon and secured to the partition 30. The latter yielding hook 143 is arranged in horizontal alinement with the extension 140 and forms a 5 stop to limit the anti-clockwise movement of the swinging arm 94. As the swinging arm 94 is rotated in an anti-clockwise direction from an operative position, the hook 142 is moved into contact with the hook 143, 10 and the hooks yield slightly downwardly and upwardly respectively, and the swinging arm 94 and its extension 140 are flexed slightly downwardly until the lower hook 142 snaps into locking engagement with the 15 upper hook 143, whereupon the swinging arm 94 is held locked in an inoperative position by the hooks 142 and 143, the swinging arm 94 being resilient and constructed to yield slightly under pressure to permit 20 of this operation. When it is desired to release the swinging arm 94, a slight pressure is applied downwardly upon the handle 141, thus flexing the extension 140 and the swinging arm 94 downwardly until the 25 lower hook 142 is disengaged from the upper hook 143, whereupon the handle 141 is moved clockwise to swing the arm 94 into an operative position.

For automatically stopping the rotation 30 of the turntable 90 when the swinging arm 94 is rotated into an inoperative position and for automatically releasing the turntable when the swinging arm 94 is moved away from an inoperative position, a bell 35 crank 150 is arranged upon the upper side of the extension 140 adjacent the margin of the turntable 90 and is mounted to swing about a vertical pivot 151 projecting upwardly from and rigid with the extension 40 140. Secured to the one end of the bell crank 150 is a brake pad 152 arranged to engage the marginal edge of the turntable 90, and secured to the other end of the bell crank 150 is a spring 153, which extends 45 longitudinally of the extension 140, and which engages at its outer end snugly, but slidably, between two studs 154, which project upwardly from and which are rigid with the extension 140. Arranged in a horizontal plane with the spring 153 and extending transversely with respect thereto, 50 is a rigid horizontal plate 155, which is preferably arranged in vertical alinement with the upper hook 143, and which is rigidly secured to the block 144 and projects inwardly therefrom. The spring 153 is normally substantially straight and normally acts to hold the brake pad 152 out of engagement with the turntable 90 when the 55 turntable 90 is in an operative position; but when the turntable 90 is moved into an inoperative position, the spring 153 comes into contact with the end of the fixed plate 155 and is flexed by the plate and swings the 60 brake pad 152 into engagement with the

turntable 90. When the spring hooks 142 and 143 are in locking engagement as shown in Figs. 1 and 2, the spring 153 is held in a flexed condition and holds the brake pad 152 against the turntable 90. When the 70 hook 142 is released from the hook 143 and the swinging arm 94 is moved clockwise from its locked position, the spring 153 returns to its normal form and releases the brake pad 152 from the turntable 90, where- 75 upon the turntable is free to be rotated by the motor.

For conveniently swinging the annular diaphragm frame 41 downwardly to permit the turntable 90 to be swung into an operative 80 position without causing the record rotated thereby to strike against the stylus 82, a vertical push rod 160 extends loosely through an aperture 161 provided therefor in the horizontal partition 30, and is rigidly secured at its lower end to the outer end of a 85 rigid horizontal arm 162, which is spaced below the frame 41 and projects radially outwardly therefrom, the arm 162 being held rigidly in spaced relationship with respect to the frame 41 by two vertical bolts 90 163, which extend through the arm 162, the annulus 61, the diaphragm 40 and the frame 41. The bolts 163 are surrounded respectively by two sleeves 164 arranged be- 95 tween the arm 162 and the under surface of the annulus 61, to space the arm a suitable distance below the frame 41.

For amplifying the sound waves produced by the vibrations of the diaphragm 100 40, there is arranged beneath the diaphragm 40 a sound amplifier which may be of any suitable construction, but which in the form shown in Figs. 1 and 2 includes two rectangular vertical vibratory wooden side 105 walls 170 and 171, arranged upon opposite sides of the diaphragm respectively and extending from the bottom wall 15 of the cabinet upwardly to a plane spaced slightly below the under surface of the horizontal partition 30, and from the side wall 18 of 110 the cabinet toward the doors 19 and 20, the front edges 172 and 173 being spaced inwardly from the inner surfaces of the doors when the doors are closed. Two horizontal 115 cleats 174 and 175 are secured to the outer surfaces of the two vibratory side walls 170 and 171 respectively, flush with the lower edges thereof, and these two cleats are rigidly secured to the bottom wall 15 by 120 means of screws 176. Two vertical cleats 177 and 178 are secured to the outer surfaces of the vibratory side walls 170 and 171, flush with the front edges 172 and 173 and extending from the horizontal cleats 174 125 and 175 to the upper edges of the side walls respectively. A horizontal strip of wood 179 is terminally secured to and connects the top portions of the front edges 172 and 173 of the vibratory side walls. Extending be- 130

tween and secured to the inner surfaces of the vibratory side walls 170 and 171 is a transversely horizontal and longitudinally curved vibratory wooden bottom wall 185, which curves downwardly and forwardly from the line of meeting between the under surface of the partition 30 and the inner surface of the side wall 18 to an imaginary line connecting the lower ends of the front edges 172 and 173, and coincident with the upper surface of the bottom wall 15. The upper edge of this curved wall 185 is secured to the inner surface of the side wall 18 in any suitable manner, as for instance, by screws 186, and its lower front edge is similarly secured to the upper surface of the bottom wall 15 in any suitable manner, as for instance, by screws 187. Between the front edges 172 and 173 of the amplifier and the inner surface of the doors 19 and 20 may be arranged any suitable screen or sound reflector, for instance, one comprising vertical side posts 188 and a series of transversely inclined vertical wooden slats 189, extending horizontally and connecting and secured to the vertical posts 188.

To prevent the diaphragm frame 41 from swinging too freely about its axis, a spring 195 may be rigidly secured to the annulus 61, and the spring may be arranged to engage a yielding pad 197 of felt or other suitable material secured to the inner surface of the vibratory side wall 170, the spring being adjusted to normally exert a slight pressure against the pad to frictionally retard the movement of the diaphragm frame 41 about its axis.

It is thought that the operation of this form of the invention will be fully understood from the foregoing description, but as a brief summary it may be stated that to reproduce sounds from a disk sound record 200, the record is arranged upon the turntable 90 with the recorded face of the record facing downwardly, the turntable being meanwhile locked in an inoperative position by the spring hooks 142 and 143. It is to be understood that the record 200 is provided upon its recorded face with a spiral groove 201 uniform in depth formed with lateral undulations corresponding to sound waves, which are adapted to cooperate with the particular form of stylus bar mounting hereinbefore described. After the record has been placed upon the turntable, the handle 141 is pressed downwardly and then laterally to move the record into operative position over the stylus 82, the stylus being meanwhile depressed by a manual pressure downwardly upon the push rod 160. After the record has thus been moved into position, the push bar 160 is released and the stylus is then swung into operative engagement with the record through the action of the spring 50, and the record may then be

moved laterally slightly if necessary to cause the needle to engage at a proper point in the undulatory groove 201, after which the operation of reproducing sound is entirely automatic, the record being fed across the stylus by the action of the stylus in engagement in the sound groove. After the reproduction of sound has been completed, the push rod 160 is depressed manually and the record is then swung anti-clockwise into an inoperative position by moving the handle 141 accordingly.

Instead of applying this invention in a talking machine having a diaphragm mounted in a vertically movable frame held against lateral movement and arranged to cooperate with a record on a rotary record support mounted to swing laterally in a substantially horizontal plane above the diaphragm, as hereinbefore described, this invention may be applied as shown in Figs. 5, 6, 7 and 8 in a talking machine provided with a rotary disk record support arranged to rotate in a fixed horizontal plane about a fixed vertical axis and a diaphragm mounted in a vertically yielding frame arranged to move laterally in a substantially horizontal plane below the record support.

Referring to Figs. 5 to 8, this modified form of the invention comprises a cabinet 225 constructed substantially as hereinbefore described and comprising a substantially rectangular body portion 226 provided with a pair of doors 227 arranged to swing outwardly, and provided with a hollow cover 228 movable with respect to the body portion, about suitable hinges 229. Arranged within the body portion 225 and adjacent the top is a substantially rigid horizontal partition 230, provided with a comparatively large opening 231 extending therethrough.

For supporting a rotary record support or turntable, a rigid hollow gear case 235 is rigidly secured in the opening 231 of the partition 230, by means of a flat flange 235' integral with the gear case and which is securely clamped to the upper surface of the partition 230 by means of a screw 236. The gear case 235 is preferably integral with two rigid arms 237 which diverge rearwardly therefrom and which project from a substantially flat horizontal motor plate 238 preferably integral therewith and which is arranged to cover a suitable opening provided therefor in the partition 230, the motor plate being secured to the partition 230 by screws 238'. The gear case 235 is provided upon its upper side with a substantially rigid flat horizontal cover 239, removably secured thereto by means of screws 240. A vertical cylindrical bushing 241 fits tightly in an aperture provided therefor in the bottom wall of the casing and is held against downward move-

ment by a cap 242, rigidly but removably secured to the underside of the casing by screws 243. Fitting snugly but rotatably in the bushing 241 is a comparatively short 5 vertical turntable spindle 245, the lower end of which is rounded or substantially semispherical in shape and rests upon the upper surface of the stationary cap 242. The spindle 245 projects upwardly from 10 the bushing 241, and the upper portion 246 of the spindle is reduced in diameter to provide an upwardly facing annular shoulder 247 spaced slightly above the upper end of the bushing 241. Coaxial with and snugly 15 but removably surrounding the reduced portion 246 of the spindle and rotatable with respect thereto and resting against the annular shoulder 247 of the spindle, is a vertical cylindrical hub 248, the lower end of 20 which is provided with a cylindrical recess 249, in which freely engages the upper end of the bushing 241. A flat horizontal annular cap 250 fits loosely around the bushing 241, and is removably secured to the 25 under surface of the hub 248 by means of screws 251. The portion of the bushing 241 above the cap 250 is enlarged to provide a downwardly facing annular shoulder 252 spaced slightly above the cap 250, to 30 prevent the withdrawal of the hub upwardly from the bushing 241.

Removably secured to the upper end of the hub 248 by means of screws 253, and coaxial with the spindle 245, is a flat horizontal record support or turntable 254. Projecting centrally through the turntable and rigid therewith and extending upwardly therefrom is a hollow elongated cylindrical cap 255, which fits snugly around the upper 35 reduced end of the turntable spindle 245 and is rotatable with respect thereto. The upper end of the cap 255 is rounded and provided with a vertical central aperture 256, for purposes of lubrication. The upper 45 surface of the turntable 254 may be provided with flat annular yielding covering 257 secured thereto.

For rotating the turntable 254, the lower end of the hub 248 is provided with an external worm gear 260, preferably integral therewith, which engages a horizontally arranged worm 261, rigidly secured to a horizontal spindle 262, the main portion of which extends rearwardly from the worm 261. The 55 front end of the spindle 262 is rotatably supported in a bracket 263 depending rigidly from the cover 239. The other end of the spindle 262 is rotatably mounted in a suitable bearing 264, depending rigidly from 60 the motor plate 238. Rigidly mounted upon the inner end of the spindle 262 is a worm 266 which is engaged by a worm-gear 267, suitably mounted to rotate upon a vertical axis and actuated by a worm-gear 268, rigid 65 with a vertical rotary spindle 269 rotated by a motor 270, of any well known or suitable construction, and depending from the motor plate 238. The motor 270 illustrated is of the spring actuated type, and is provided with a governor 275 controlled by a rotary 70 indicator 276, and has a winding spindle 277 controlled by a handle 278.

For cooperation with a record 280 mounted upon the turntable 254 and having its recorded surface facing downwardly 75 there is provided a comparatively large diaphragm 281, preferably constructed as hereinbefore described, and marginally secured, as hereinbefore described, to an annular frame 282, which is normally arranged in 80 a substantially horizontal plane spaced below the turntable 254. The frame 282 is movably supported upon one side by two rollers 283 and 284, which are mounted to rotate upon normally substantially horizontal 85 studs 285 and 286, which are rigidly connected to the frame 282 by means of brackets 287 and 288. The two rollers 283 and 284 are supported upon a substantially horizontal rigid track 290, which is secured at 90 each end to the horizontal partition 230 by means of bolts 291 extending through the partition and through two plates 292, arranged upon opposite sides of the partition respectively, the partition 230 and the plates 95 292 being provided with spaced apertures 293 to permit of the lateral adjustment of the track 290 to accommodate different sizes of diaphragms. The partition 230 is provided on its under side with recesses 294 100 to permit of the necessary travel of the frame 282.

The rollers 283 and 284 are preferably provided with marginal V shaped annular grooves and the upper surface of the track 105 290 is preferably in the form of a knife edge substantially V shaped in transverse section and more acute than the grooves in the rollers in which the knife edge engages. The 110 under surface of the track 290 is preferably transversely curved about an axis coincident with the knife edge upon which the rollers 283 and 284 rest. The lower curved surface of the track 290 is engaged by a roller 295 mounted to rotate in a bracket 296, depending rigidly from the frame 282. The rollers 283, 284 and 295 are held against movement longitudinally of their axes with respect to the frame 282, and while guiding the frame 282 to move in a direction parallel 120 to the knife edge of the track 290, permit the frame to oscillate to the limited extent required about the knife edge as an axis.

For yieldingly supporting the frame 282 to move either horizontally in a predetermined plane or to be oscillated vertically about the track 290, a roller 298 is arranged to rotate about a substantially horizontal axis on a spindle 299 carried by a yoke 300 125 secured to the free end of a yielding spring 130

301, which is inclined downwardly from the frame 282 and the upper end of which is rigidly secured thereto in any suitable manner at a point substantially opposite the roller 295. This roller 298 rests upon a horizontal flat track 302, which is spaced below the horizontal partition 230 and held in fixed relationship with respect thereto by any suitable means, as for instance, by a bracket 303, depending from the motor plate 238.

For vibrating the diaphragm 281, in accordance with a sound record, an upwardly inclined stylus 310, the upper end of which is pointed, is mounted in a stylus bar 311 to oscillate upon a rigid base 312 arranged above the central portion of the diaphragm and rigidly connected to the frame 282 by radial arms 313, the stylus bar in its mounting being constructed as hereinafore described. The construction of the stylus bar and its mounting is such that the stylus 310, when not in coöperative engagement with the under surface of a record positioned upon the turntable 254, is normally maintained with its free end in a horizontal plane slightly above the plane which would be occupied by the lower face of a record on the turntable. When the stylus is in engagement with the under surface of a record on the turntable, the stylus is held depressed from its normal position under the action of the record, the spring arm 301 carrying the roller 298 being adjusted to permit this depression and being arranged and proportioned to provide a proper amount of vertical pressure between the stylus and the under surface of the record to maintain the stylus in operative engagement with the record.

The record 280 may be clamped downwardly against the upper surface of the turntable, as, for instance, by a circular disk 315 of wood or any other suitable material, and of sufficient mass to hold the record in position with respect to the turntable. This disk 315 is preferably provided centrally upon its under surface with a suitable recess 316 to receive the cap 255. This disk serves not only to hold the record in place, but also acts as a fly wheel to assist in controlling the speed of the motor, and thus performs a similar function to that performed by comparatively large heavy turntables, which are used in the ordinary forms of disk talking machines. This disk 315 may also be used with any other suitable form of talking machine.

Any suitable brake may be provided operative to stop or to release the turntable 254 and the motor. In the construction shown, a brake is provided consisting of a screw 317, threaded downwardly through the plate 265, and engaging at its lower end against a horizontal disk 318 above the

worm-gear 268, and coaxial with and rigidly secured to the motor spindle 269.

For directing the sound waves produced by the diaphragm 281 downwardly within the cabinet, a comparatively short downwardly flaring annular sound amplifier 320 may be arranged beneath the frame 282 and coaxial therewith. The upper end of the amplifier 320 is preferably of the same internal diameter as the internal diameter of the frame 282, and is preferably provided with a flat annular flange 321 integral therewith and projecting outwardly therefrom, which is clamped rigidly against the under surface of the marginal portion of the diaphragm 281 by screws 322. For deflecting the sounds delivered from the amplifier 320 outwardly in a substantially horizontal direction through the opening controlled by the doors 227, a transversely horizontal and longitudinally curved sounding board or deflector 324 is marginally secured within the cabinet and beneath the amplifier.

It is thought that the operation of this modified form of this invention will be fully understood from the foregoing description, it being understood that this device is adapted to coöperate with the usual sound record provided with a laterally undulating sound groove of substantially uniform depth, as hereinbefore described.

Although only two forms have been shown in which this invention may be embodied, it is evident that the invention is not limited to any specific construction, but might be applied in various forms without departing from the spirit of the invention or the scope of the appended claims. For instance, instead of providing the diaphragm with a stylus bar arranged to coöperate with a record provided with a laterally undulating groove, the diaphragm might be provided with a stylus bar of any well known or suitable construction arranged to coöperate with the well known form of sound record having a groove in the form of "hill and dale", or "up and down", or "vertical" undulations.

Having thus fully described this invention, I claim and desire to protect by Letters Patent of the United States:

1. In a talking machine, a cabinet providing a compartment, an opening in a wall of said compartment, a diaphragm substantially closing said opening and delivering sound directly into said compartment provided with a stylus, and means to support a record in said cabinet and outside of said compartment and in coöperative relation with said stylus.

2. In a talking machine, the combination of a cabinet, a partition forming in said cabinet a sound amplifying compartment, an opening in said partition, a diaphragm substantially closing said opening delivering sound directly into said compartment,

a stylus for oscillating the diaphragm, and means to support a record outside of said compartment and in coöperative relation to said stylus.

5 3. In a talking machine, a cabinet provided with a substantially horizontal partition provided with an opening, of an approximately horizontal vibratory diaphragm arranged in vertical alinement with said
10 opening to deliver sounds downwardly in said cabinet below said partition and means for supporting a sound record above and in coöperative relation with said diaphragm.

4. In a talking machine, the combination
15 with a cabinet provided with a sound outlet, of a rotary record support, a partition provided with an opening and arranged between said record support and said outlet, and a diaphragm arranged to cover a portion
20 of said opening and to coöperate with a record on said support.

5. In a talking machine, the combination with a cabinet provided with a sound outlet, of a rotary record support, a partition provided with an opening and arranged between
25 said record support and said outlet, a diaphragm arranged to cover a portion of said opening and to coöperate with a record on said support, and sound amplifying means arranged between said diaphragm
30 and said outlet.

6. In a talking machine the combination of a casing having a partition forming an amplifying chamber and provided with an
35 opening in said partition, a diaphragm substantially closing said opening, a stylus operatively connected to said diaphragm and extending away from said chamber, a record support, means to rotate said record
40 support, and yielding means operative to hold said stylus in engagement with said record, the engagement of said stylus with the record on said support effecting a relative transverse movement between said diaphragm and said record.
45

7. In a talking machine the combination of a casing having a partition forming an amplifying chamber and provided with an opening in said partition, a diaphragm
50 mounted in said opening and substantially filling the same, a stylus operatively connected to said diaphragm and extending outside of said chamber, a record support, means to rotate said record support, and
55 yielding means tending to hold said stylus in engagement with said record, said record support being propelled transversely across said diaphragm by the engagement of said stylus with the record on said support.

8. In a talking machine, the combination of a cabinet, a partition forming in said cabinet a sound amplifying compartment and having an opening therein, a diaphragm
60 mounted in said opening and substantially closing the same, a stylus operatively con-

nected with said diaphragm and extending outside of said compartment, a record support, means to rotate said record support, and a carrier for said record support, where-
70 by said record support is freely movable in a plane parallel to said diaphragm; said record support being propelled in said plane by the engagement of said stylus with the record on said support.

9. In a talking machine, the combination
75 of a cabinet, a partition in said cabinet forming a sound amplifying compartment, a vibratory diaphragm in a wall of said compartment and arranged to deliver sound waves directly into said compartment, a
80 record support outside of said compartment and within said cabinet, a stylus operatively connected with said diaphragm and extending outside of said compartment, and a closure for said cabinet inclosing said record support, said cabinet being provided with
85 an opening in a wall thereof forming a sound outlet for said sound amplifying compartment and a closure for said last-mentioned opening.
90

10. In a talking machine the combination with a substantially horizontal disk record support arranged to rotate about a substantially vertical axis and to oscillate simultaneously about an axis substantially parallel
95 to said first-mentioned axis, of means arranged to automatically stop the rotation of said support at an approximately predetermined point in said path, and means for automatically locking said record support
100 against movement about said second-mentioned axis.

11. In a talking machine, a rotatable and transversely movable record support, means
105 to rotate the support, a vibratory diaphragm located below said support and arranged normally in a relatively fixed position, a stylus extending upwardly into engagement with a record on the support and arranged to vibrate the diaphragm and
110 move the record and support relatively thereto.

12. In a talking machine, a rotatable swinging record support, means to rotate
115 the support, a relatively large vibratory diaphragm yieldingly pivoted in a normally fixed position below said record support, a stylus extending upwardly to engage a record on the said support and arranged to vibrate the diaphragm and effect a relatively
120 transverse movement between the diaphragm and record, and means to depress the diaphragm to move the stylus out of engagement with the record.

13. In a talking machine, a rotatable
125 swinging record support, means to rotate the support, a vibratory diaphragm yieldingly pivoted in a normally fixed position below said record support, a stylus extending upwardly to engage a record on the
130

support and arranged to vibrate the diaphragm and effect a relatively transverse movement between the diaphragm and record, and means to retard movement of said diaphragm toward and from said record support.

5

In witness whereof, I have hereunto set

my hand and seal this 15th day of November, A. D. 1913.

LOUIS LUMIERE. [L. s.]

Witnesses:

GASTON JEANVIAUX,
MARIUS MERMAZ,

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE MOTOR.

1,246,823 ----- W. G. Shelton.

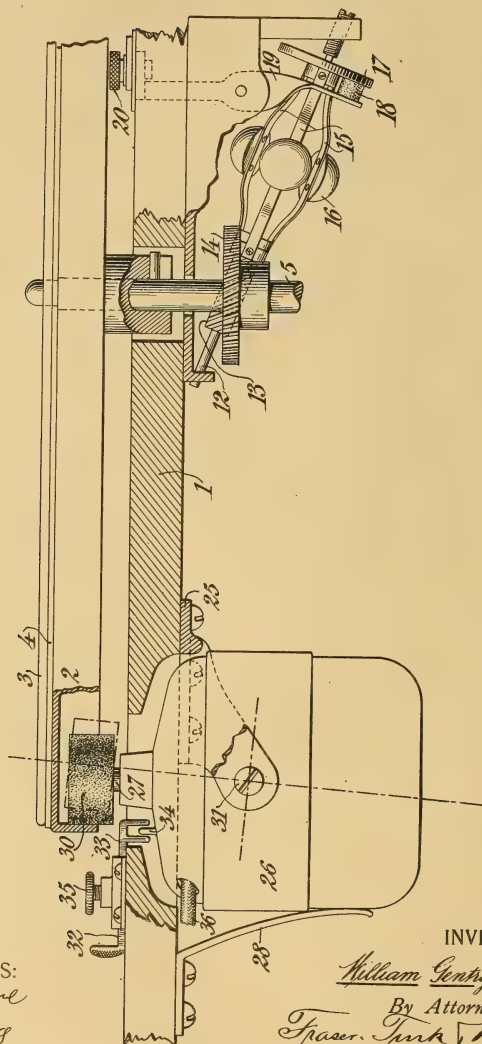
Patented Nov. 13, 1917.

Filed Dec. 18, 1916.

W. G. SHELTON.
TALKING MACHINE MOTOR.
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1,246,823.

Patented Nov. 13, 1917.



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UNITED STATES PATENT OFFICE.

WILLIAM GENTRY SHELTON, OF NEW YORK, N. Y.

TALKING-MACHINE MOTOR.

1,246,823.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Original applications filed September 23, 1915, Serial No. 52,255, and April 10, 1916, Serial No. 90,051.

Divided and this application filed December 18, 1916. Serial No. 137,621.

To all whom it may concern:

Be it known that I, WILLIAM GENTRY SHELTON, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Talking-Machine Motors, of which the following is a specification.

This invention relates to mechanism for driving the record of a talking machine, the object of the invention being to provide a satisfactory, simple and inexpensive device of this character, and one wherein the vibrations of the motor are absorbed so that they are not communicated to the talking machine record.

This application is divisional of my co-pending application, Serial No. 52,255, filed September 23, 1915, for independent talking machine motor, and of my co-pending application, Serial No. 90,051, filed April 10, 1916, for driving mechanism.

The drawing accompanying and forming part of this application is a view partly in elevation and partly in vertical section of a practicable embodiment of my invention as applied to a talking machine.

For the purpose of illustrating the invention, a talking machine mechanism has been selected to show the application of certain parts of the invention in their peculiar relation thereto.

The table 1 of the framework is shown carrying a horizontally disposed rotary supporting platen 2 for carrying and rotating the record disk 3. Some suitable material such as felt 4 is preferably interposed between the platen and the record. The platen is shown carried by a spindle 5 disposed in substantially a vertical position and acting as the axis or pivot about which the platen is rotated.

In the present showing the platen and spindle 5 are adapted to move together. A governor is provided for the platen and is adapted to control the speed of the same whether the rotative force is applied to the platen through the spindle or is applied to the spindle through the platen. A well known form of ball governor is shown in the present illustration. This comprises a spindle 12 mounted in suitable bearings and carrying a worm wheel 13 meshing with a worm wheel 14 fast on the platen spindle 5. The governor spindle has associated with it

a plurality of spring members 15, each provided with a suitable weight or ball 16. Spring members 15 are shown connected to a plate 17, which upon the rotation of the platen 2 and the outward centrifugal movement of the balls, will be drawn toward the left in the illustration, and upon excessive rotation against a suitable braking device. The drawing shows the parts in the position of rest, and the friction member 18 of the brake in engagement with the governor disk 17. The friction member 18 is shown carried by a lever 19 pivoted to the framework and associated with actuating mechanism 20 on the upper side of the table 1. In this form of governor, the brake lever is set either at the position of stop or any predetermined degree of speed and coöperates with the governor in assuring the proper control of the platen when under the rotative influence of driving mechanism.

The electric motor illustrated in the drawing is shown permanently attached to the underside of the table 1 of the framework by means of a supporting bracket 25 secured in position by means of screws. The term "permanently connected" is used to indicate that the motor illustrated is preferably built in with the machine and constitutes a part thereof, and when built in becomes an element of the permanent equipment. The electric motor is shown mounted in the casing or housing 26 pivotally supported at 31 by the bracket 25. The shaft 27 of the motor is shown extending above the table and there provided with a driving pulley 30. This pulley is preferably so proportioned that when the motor shaft is in substantially vertical position or parallel with the platen spindle 5, the driving pulley tractively engages the platen 2. A leaf spring 28 is shown for pressing against the motor casing 26, and yieldably impelling the pulley 30 to its work. The pulley is preferably made of elastically yieldable material, as, for instance, sponge rubber. The yieldability of the motor and its casing incident to the elasticity of the spring 28, permits of the driving pulley 30 of the motor having secure and sufficient tractive engagement with the platen for driving this forward without slipping. Owing to the undulations in movement, or eccentricity of the platen relative to its shaft, or the journals of the shaft of the talking machine, a certain

amount of yieldability of the driving pulley of the motor toward and from the platen is essential, and is provided by means of the construction above described. The tractive engagement and the yieldability of the parts is enhanced by constructing the pulley 30 of some very elastic material, and any shocks or jars incident to operation are largely minimized by such construction.

As was above stated, a good material for the pulley 30 is sponge rubber or its equivalent.

As a traction drive for a talking machine record support, sponge rubber is a material which offers a positive means of driving the phonograph turntable without undue slipping, and at the same time provides a resilient contact which is noiseless. Applicant knows of no other material which is so well suited for this purpose. The sponge rubber offers the natural adhesive qualities of rubber, and because of this resiliency offers a large contacting area with a minimum pressure. The natural adhesive qualities of rubber being great, the drive is effected with a minimum of friction on the motor shaft.

In some installations the sponge rubber in the pulley will be found to offer the necessary resiliency to insure good tractive contact without the use of auxiliary springs.

The spring 28 in the present illustration as is above described, serves two functions: (1) that of insuring the contact between the pulley and its work, and (2) that of co-operating with the mechanism for holding the pulley away from its work in preventing any noise incident to vibrations which might arise were the spring not present.

The features herein illustrated of the underneath electrical drive for a talking machine wherein the motor is mounted beneath the record-supporting platen and is provided with an upwardly-extending pulley, is broadly claimed in a co-pending application, Serial No. 90,051, above identified.

What I claim is:—

1. A frictional driver comprising a motor having a shaft and a pulley formed of sponge rubber mounted on such shaft.
2. The combination with a rotatable talk-

ing machine record, of a frictional driver therefor comprising a motor having a shaft and a pulley formed of sponge rubber mounted upon such shaft and adapted to engage the said record.

3. The combination with a rotary talking machine record support, of an electric motor, and a sponge rubber pulley carried by the motor for frictionally driving the said record support.

4. The combination with a rotary talking machine record support, of an electric motor, and a sponge rubber pulley carried by the motor for frictionally engaging and driving the said record support.

5. The combination with a rotary talking machine record support, of an electric motor, a sponge rubber pulley carried by the motor for frictionally engaging and driving the said record support, and means for elastically yieldably impelling the pulley against the said record support.

6. The combination with a phonograph table disposed in a substantially horizontal position, of a rotary record support mounted above such table, an electric motor mounted below such table and provided with a shaft extending through the table, and a sponge rubber pulley mounted upon said shaft extension for engaging and frictionally driving the record support.

7. The combination with a phonograph table disposed in a substantially horizontal position, of a rotary record support mounted above such table, an electric motor mounted below such table and provided with a shaft extending through the table, a sponge rubber pulley mounted upon said shaft extension for engaging and frictionally driving the record support, and means for elastically yieldably impelling the pulley against the said record support.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM GENTRY SHELTON.

Witnesses:

J. MOORES PEACOCK,
G. B. GERHARD.

PHONOGRAPH TRANSMITTER.

1,246,895 ----- H. C. Egerton.
Patented Nov. 20, 1917.
Filed Nov. 25, 1914.

H. C. EGERTON.
 PHONOGRAPH TRANSMITTER.
 APPLICATION FILED NOV. 25, 1914.

1,246,895.

Patented Nov. 20, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

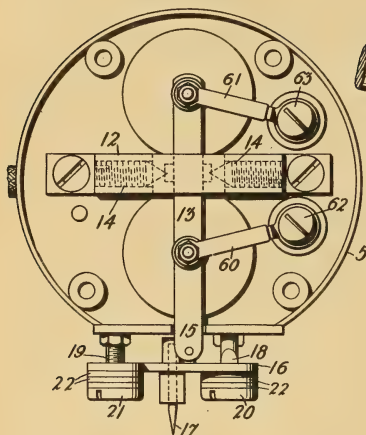


Fig. 4.

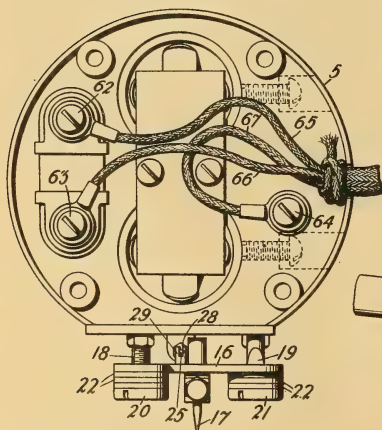


Fig. 2.

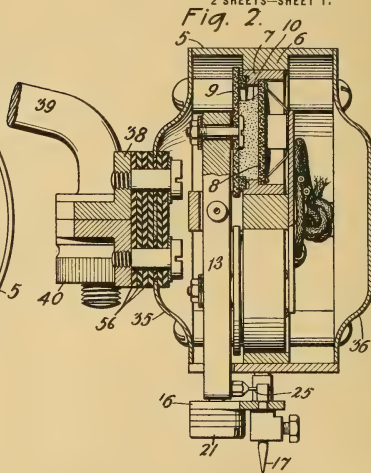
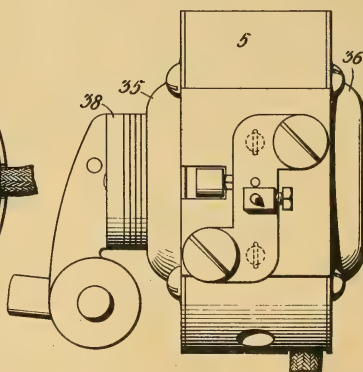


Fig. 3.



Witnesses:

O. M. Burke
J. E. Parnum

Inventor:

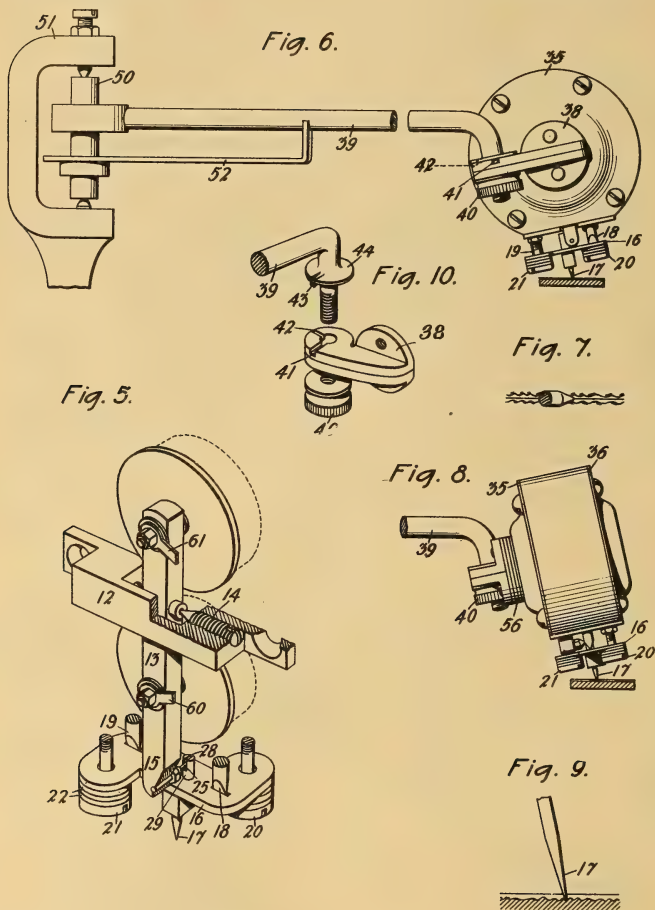
Henry C. Egerton
 by *A. C. Munnell* Att'y.

H. C. EGERTON.
 PHONOGRAPH TRANSMITTER.
 APPLICATION FILED NOV. 25, 1914.

1,246,895.

Patented Nov. 20, 1917.

2 SHEETS—SHEET 2.



Witnesses:
 O. M. Guthrie
 D. C. Rammann

Inventor:
 Henry C. Egerton
 by A. C. Munroe, Att'y.

UNITED STATES PATENT OFFICE.

HENRY C. EGERTON, OF PASSAIC, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WESTERN ELECTRIC COMPANY, INCORPORATED, A CORPORATION OF NEW YORK.

PHONOGRAPH-TRANSMITTER.

1,246,895.

Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed November 25, 1914. Serial No. 873,861.

To all whom it may concern:

Be it known that I, HENRY C. EGERTON, a citizen of the United States, residing at Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Phonograph-Transmitters, of which the following is a full, clear, concise, and exact description.

This invention relates to transmitting apparatus, and more particularly to a transmitter for transmitting to a circuit the vibrations of a phonograph record.

The object of this invention is to provide a compact and efficient structure of this class in which the various elements are mounted in a unitary structure and are constructed and combined to produce the best operation.

According to one feature of this invention the resistance varying means, the stylus and a motion reducing lever system for transmitting the movement of the stylus to the resistance varying means are all carried by a single compact casing.

Means are also provided for transmitting to the resistance varying means only push and pull impulses, caused by the engagement of the stylus with the sound reproducing undulations. This feature consists in the use of a connecting means between the stylus and the lever system, which connecting means is rigid with respect to push and pull vibrations applied thereto longitudinally, but is flexible with respect to laterally applied vibrations.

A third feature of the invention relates to the means provided for adjusting the transmitter structure to different angular positions, whereby the stylus may receive and transmit to the resistance varying means either lateral or vertical vibrations received from a record in order that the device may be operated with either of the forms of commercial records.

In the drawings illustrating this invention—

Figure 1 is a front elevation view with the casing removed of a device embodying this invention;

Fig. 2 is a cross-section of the device shown in Fig. 1;

Fig. 3 is a bottom view of the device;

Fig. 4 is a rear elevation view of the device with the casing removed;

Fig. 5 is a detail perspective view showing the arrangement of the lever system;

Fig. 6 is a view in side elevation of a supporting arm with the device shown in one of its angular positions;

Fig. 7 is a plan view of a record with which the device works when in the position shown in Fig. 6;

Fig. 8 is a view in side elevation of the device in a different angular position from that shown in Fig. 6;

Fig. 9 is a sectional view of the record with which the device coöperates when in the position shown in Fig. 8; and

Fig. 10 is a detail view of the mounting for the device.

In the drawings, 5 designates a frame member having a centrally located web or plate 6 in which are mounted two transmitter buttons. Each transmitter button comprises a container 7, a stationary electrode 8, a movable electrode 9 and a resistance varying medium 10 located between the stationary and movable electrodes. Mounted upon the web 6 is a bridge piece 12, which supports a lever 13, said lever being supported upon said bridge piece 12 by means of pivoting screws 14, 14. The end of the lever 13 is connected with the movable electrode 9 of one of the transmitter buttons, the movable electrode 9 of the other button being connected to said lever upon the opposite side of its pivotal support. The other end of the lever 13 is extended, as shown at 15, and is connected with a second lever 16 carrying a stylus 17 which is adapted to receive and transmit to the transmitter buttons vibrations in accordance with the undulations of a phonograph record. The pivotal support of the lever 13 is so related to the end of the said lever to which the force is applied that the movement transmitted to the movable electrodes is only about half as great as the movement applied to the end 15 of the lever 13.

The lever 16 is retained against knife edge bearings 18 and 19 projecting from the frame member 5 by means of screws 20 and 21 which engage the frame member 5. Inserted between the bottom face of the lever 16 and the heads of the screws 20 and 21 are rubber buffer members 22, 22, the purpose of these buffers being to efficiently dampen the movement of the vibratory member or stylus 17. In order to make the operation of these buffers more positive and their position more important mechanically, the

stylus arm is made shorter than is customary in the ordinary phonograph, thereby increasing the angular movement of the lever 16, as determined by the engagement of the stylus 17 with the record, and consequently causing more work to be done upon the rubber buffers 22, 22.

Extending from the end 15 of the lever 13 is a connecting member 25, which is preferably formed of comparatively fine wire which is sufficiently stiff to resist flexure when push and pull vibrations are applied longitudinally thereof, but flexing readily in response to transversely applied vibrations. This connecting means extends through a slot 28 in a post or extension 29 carried by the lever 16 and is secured therein preferably by applying a drop of solder thereto. The post or extension 29 is shorter than that portion of the stylus 17 which extends below the lever 16 for engagement with the record of the phonograph, whereby the vibrations of said stylus, in response to the record, are reduced in amplitude in their transmission to the lever 13. By reason of the above described characteristics of the connecting member 25, the vibrations set up in the stylus by irregularities in the record other than those designed to operate on the stylus, and particularly such irregularities as tend to vibrate the stylus in a direction other than the direction in which it is to be vibrated by the reproducing undulations, will not be transmitted to the transmitter buttons, thereby eliminating undesirable and confusing sounds which might otherwise be transmitted.

End members 35 and 36, secured to the frame plate 5 inclose the transmitter buttons and form with said frame plate 5 a complete casing. Secured to the end member 35 and extending therefrom is a bracket member 38 which is provided with an opening adapted to receive the end of a bracket arm 39, which is screw-threaded to receive a thumb nut 40. The upper face of the bracket member 38 is provided with two notches or recesses 41 and 42, extending at approximately right angles to each other, and adapted to separately engage a projection 43, provided on a collar 44 on the end of the bracket arm 39. When the transmitter is in the position shown in Fig. 6 with the notch or recess 42 engaging the projection 43, the lever system will be in such a position that lateral movements, applied to the stylus, by a record will swing the lever 16 about its pivots and transmit vibrations to the transmitter buttons, in accordance with the lateral undulations of the record. By loosening the thumb nut 40 and swinging the transmitter through an angle of approximately ninety degrees until the notch 41 engages the projection 43 on the collar 44 and clamping the device in posi-

tion, vertical vibrations applied to the stylus will cause the lever 16 to swing about its bearings, and transmit to the transmitter buttons movements in accordance with the vertical undulations in a record with which the stylus engages.

The bracket arm 39 is pivotally mounted upon bearing member 50 to swing in a vertical direction, said bearing member 50 being pivotally supported in a forked member 51 to swing laterally. A member 52 is provided for retaining the transmitter in an elevated position when it is removed from the record.

In order to more fully insure against undesirable vibrations in the transmitter system, rubber bushings 56 are provided between the bracket member 38 and the end member 35 of the casing.

The movable electrodes of the transmitter buttons are connected by means of conductors 60 and 61 with binding screws 62 and 63, while the circuit connection for the stationary electrodes is through the frame member 5 to which is secured a binding screw 64. Three conductors 65, 66 and 67 are connected with binding screws or posts 62, 63 and 64.

What is claimed is:

1. In a phonograph transmitter, a main lever arm, a microphonic element actuated thereby, an auxiliary lever arm, pivotal supporting means therefor, a stylus carried by said auxiliary lever arm, and a resilient rod rigidly secured to and connecting said lever arms and extending at right angles thereto, whereby vibration of said stylus in a direction parallel with said rod will be transmitted to said main lever arm and vibrations of said stylus in a direction transverse to said rod will not be transmitted to said main lever arm.

2. In a phonograph transmitter, a main lever arm, two microphonic elements actuated thereby, pivots for the main lever arm located intermediate said microphonic elements, an auxiliary arm, a pivotal supporting means therefor, a stylus carried by said auxiliary lever arm and a resilient rod connecting said lever arms and extending at right angles thereto whereby vibrations of said stylus in a direction parallel with said rod will be transmitted to said main lever arm and vibrations of said stylus in a direction transverse to said rod will not be transmitted to said main lever arm.

3. In a phonograph transmitter, a main lever arm, a microphonic element actuated thereby, an auxiliary lever arm extending in a plane parallel to said main lever arm, pivotal supporting means for said auxiliary lever arm, a stylus carried by said auxiliary lever arm and a resilient rod connecting said lever arms and extending at right angles thereto, whereby vibrations of said stylus in a direction parallel with said rod will

be transmitted to said main lever arm and vibrations of said stylus in a direction transverse to said rod will not be transmitted to said main lever arm.

5 4. In a phonograph transmitter, a main lever arm, a microphonic element actuated thereby, an auxiliary lever arm extending in prolongation of said main lever arm and in a plane parallel thereto, pivotal sup-
10 porting means for said auxiliary lever arm, a stylus carried by said auxiliary lever arm and a resilient rod connecting said lever arms and extending at right angles thereto whereby vibrations of said stylus in a direc-
15 tion parallel to said rod will be transmitted to said main lever arm and vibrations of said stylus in a direction transverse to said rod will not be transmitted to said main lever arm.

20 5. In a phonograph transmitter, a supporting framework, a main lever arm, a microphonic element actuated thereby, an auxiliary lever arm comprising a stylus arm and a mounting plate, means to pivot said
25 mounting plate on said supporting framework, resilient means for holding said plate in engagement with said pivoting means and a resilient rod connecting said main and auxiliary lever arms and extending at right

angles thereto, whereby vibrations of said stylus in a direction parallel with said rod will be transmitted to said main lever arm and vibrations of said stylus in a direction transverse to said rod will not be transmitted to said lever arm. 30 35

6. In a phonograph transmitter, a variable resistance, means including a granular resistance material and electrodes co-acting therewith, a stylus to engage a pho-
40 nograph record, a lever system connecting said stylus with said variable resistance means, supporting means for said lever system, means to change the angular position of said lever means and a stylus relative to
45 said supporting means whereby the vertical or transverse movements of said stylus will be transmitted to said resistance means; said resistance means being arranged so that said electrodes extend in a substantially
50 upright position whether said stylus is positioned for vertical or transverse movement.

In witness whereof I hereunto subscribe my name this 23d day of November, A. D. 1914.

HENRY C. EGERTON.

Witnesses:

E. EDLER,

K. L. STAHL.

CIRCLE LINE WAVE DOUBLE DISK RECORD
FOR SOUND-REPRODUCING MACHINES.

1,247,163 ----- J. A. Sowell.
Patented Nov. 20, 1917.
Filed March 8, 1916.

J. A. SOWELL.
CIRCLE LINE WAVE DOUBLE DISK RECORD FOR SOUND PRODUCING MACHINES.
APPLICATION FILED MAR. 8, 1916.

1,247,163.

Patented Nov. 20, 1917.

Fig. 1

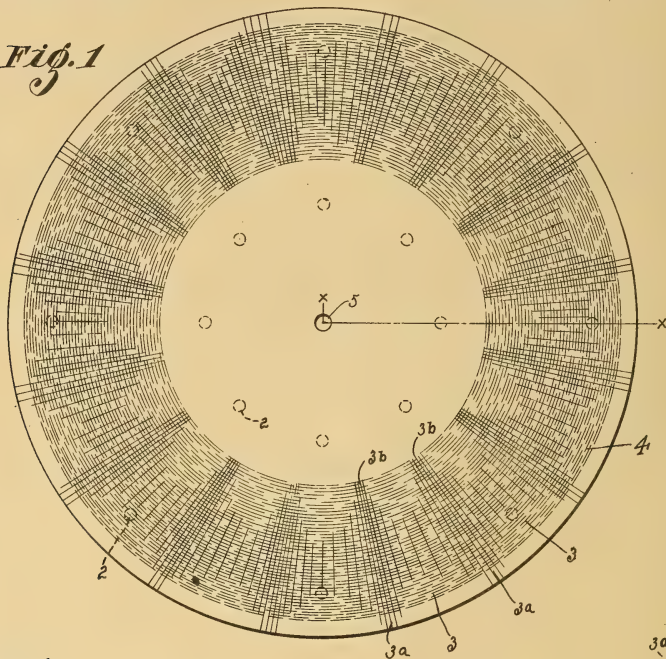


Fig. 2

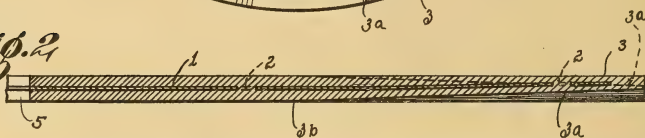


Fig. 3



WITNESS.

Floyd M. Blanchard

INVENTOR.
John A. Sowell
BY *Henry Shubert*
ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN A. SOWELL, OF SACRAMENTO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO E. E. SOWELL, OF SACRAMENTO, CALIFORNIA.

CIRCLE-LINE-WAVE DOUBLE DISK RECORD FOR SOUND-PRODUCING MACHINES.

1,247,163.

Specification of Letters Patent.

Patented Nov. 20, 1917.

Application filed March 8, 1916. Serial No. 82,926.

To all whom it may concern:

Be it known that I, JOHN A. SOWELL, a citizen of the United States, residing at Sacramento, in the county of Sacramento,

State of California, have invented certain new and useful Improvements in Circle-Line-Wave Double Disk Records for Sound-Producing Machines; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in double disk records for sound producing machines, the object of the invention being to produce a record which will carry a greater number of impression lines to a given diameter than the disks now commonly used.

A further aim of the invention is to so construct the record that it will allow of a better reproduction especially as the needle of the sound producing machine moves toward the center of the record.

The invention embodies a record formed in radial waves with a slight inclination upward from the outer edges of the valleys between the waves to the inner edges thereof so that as the needle travels toward the center of the record it will move on a slight inclination upward causing it to maintain a slight frictional action which will greatly increase the efficiency of the sound production.

Also by reason of these waves the impression lines are relatively longer than they would be on flat surface and hence a greater number can be placed on a record of a given diameter than on the now commonly used flat records. The invention also embodies certain other advantageous features which will hereinafter appear.

A still further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a top plan view of my improved record.

Fig. 2 is a sectional view taken on a line X-X of Fig. 1 and twice enlarged.

Fig. 3 is an edge view of the record as shown in Fig. 1.

Referring now more particularly to the characters of reference on the drawings, the record is made up primarily of a stiffening plate 1 which may be of metal or other suitable material provided with a plurality of holes 2 the composition of the record proper being molded over the metal plate 1 and through the said holes 2 to form a composite member, the said metal plate being so formed as to follow the general shape of the composite record as hereinafter set forth.

The record itself is formed into a plurality of radial waves 3, the valleys of which, as at 3^a, have a slight inclination upward from the outer edge of the record inwardly to the inner limit, of the sound impression lines, as at 3^b.

The sound impression lines 4 are made in a spiral line and due to the radial waves a greater length of this line can be had on a record of a given diameter than records now commonly in use. By reason of the inclination of the valleys 3^a, and the sloping of the hills upwardly from the valleys, the sound producing needle in traveling over the record works gradually "uphill" causing it to have perfect frictional engagement at all times with the record thus allowing of the greatest efficiency in the sound production.

The metal plate formed within the material of the composite record is shaped to conform to the radial waves described above and by reason of this metal plate being so centrally located within the record, and also having these radial waves, this causes the same to form a stiffener and reinforcement for the record so that it will not be subject to cracking or warping in hot weather and will be much more durable and less liable to breakage than the now commonly constructed records.

In addition to the greater efficiency in sound production which can be had with the use of my improved record due to the "uphill" climb of the needle as indicated above, the record will also allow of a much stronger volume of sound production due to the fact that since I will have space for a greater length of line than the ordinary record I can provide a greater strength of material between each convolution of the line and still

allow of a musical composition of more than the usual length being placed upon a record of given diameter.

- The hills of the waves on each side of the disk lie flush with the center or hub portion of the disk, whereby the hills will all lie flush on the revolving plate or disk of the sound producing machine so as to hold the record in the proper horizontal position.
- 10 The record of course has a central opening 5 to fit over the receiving pin on the revolving plate or disk.

From the foregoing description it will readily be seen that I have produced such a device as substantially fulfils the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to

25 secure by Letters Patent is:

1. A record for sound producing machines comprising a circular disk having its record surface formed into radial waves, as described.

30 2. A record for sound producing machines comprising a circular disk having its record surface formed into radial waves, the valleys of the waves inclining upwardly from their outer to their inner edges, as described.

35 3. A record for sound producing machines comprising a circular disk having its record

surface formed into radial waves, the valleys of the waves inclining upwardly from their outer to their inner edges, and a spiral impression line formed over the radial waves, 40 as described.

4. A record for sound producing machines comprising a circular metal plate formed into radial waves, and a body portion formed over the metal plate on both sides thereof 45 and shaped to conform to the radial waves of the said metal plate, as described.

5. A sound reproducing record having a surface provided with portions which extend upwardly and downwardly from other portions thereof, and having a record groove 50 extending over the said portions.

6. A sound-reproducing record having a surface provided with connected portions which extend upwardly and downwardly in alternate succession, and having a record groove extending over the said portions. 55

7. A sound reproducing record having an undulating surface, and having a record groove extending over said surface. 60

8. A sound-reproducing record having a surface provided with a circular series of connected undulations, and having a record groove extending over the undulations of said surface. 65

9. A sound-reproducing record having a surface provided with a circular series of connected undulations radiating from the axis thereof, and having a record groove extending over the undulations of said surface. 70

In testimony whereof I affix my signature.

JOHN A. SOWELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

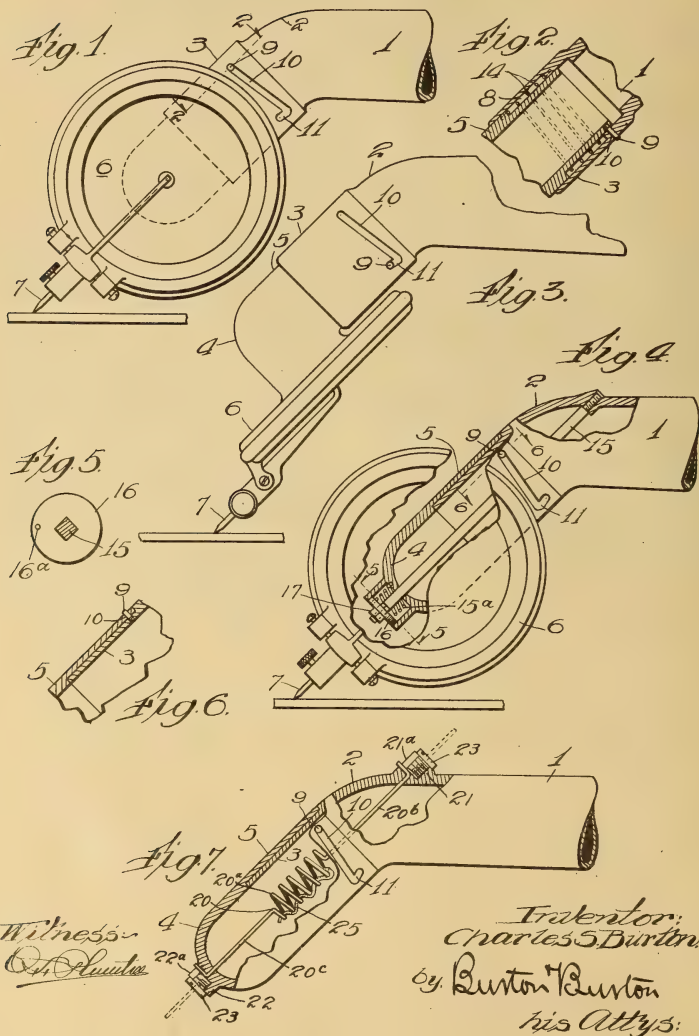
PHONOGRAPH SOUND BOX CONNECTION.

1,247,219 ----- C. S. Burton,
Patented Nov. 20, 1917.
Filed Nov. 13, 1916.

C. S. BURTON.
 PHONOGRAPH SOUND BOX CONNECTION.
 APPLICATION FILED NOV. 13, 1916.

1,247,219.

Patented Nov. 20, 1917.



Witness
Chas. H. H. H.

Inventor:
 Charles S. Burton
 by *Burton & Burton*
 his Attys.

UNITED STATES PATENT OFFICE.

CHARLES S. BURTON, OF OAK PARK, ILLINOIS.

PHONOGRAPH-SOUND-BOX CONNECTION.

1,247,219.

Specification of Letters Patent.

Patented Nov. 20, 1917.

Application filed November 13, 1916. Serial No. 130,947.

To all whom it may concern:

Be it known that I, CHARLES S. BURTON, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonograph-Sound-Box Connections, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved connection between the sound box and the tone arm of a phonograph, adapted to permit swiveling of the two connected parts for adjustment of the sound box to two positions, and particularly adapted to permit such adjustment for adapting to zig-zag and hill-and-vale records, the specific purpose being to insure the adjustment from one position to the other being made completely and not halted with the parts at an intermediate position. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of a portion of the tone arm and sound box embodying this invention in one of its forms.

Fig. 2 is a section axial with respect to the two inter-telescoping and swiveled members.

Fig. 3 is a detail side elevation showing the two parts at a different adjustment from that shown in Fig. 1.

Fig. 4 is a side elevation of a modified form, the parts being broken away and shown in axial section.

Fig. 5 is a detail section at the line, 5—5, on Fig. 4.

Fig. 6 is a detail section at the line, 6—6, on Fig. 4.

Fig. 7 is a view similar to Fig. 3, showing a modified form.

In the drawings the free end of the swinging tone arm, 1, has an elbow, 2, whose angle is about 135° so that the terminal, 3, trends downward at a slope of about 45° for inter-telescoping connection with the similarly inclined terminal member, 5, of the elbow, 4, which leads into the center of the sound box, 6. The two members, 3 and 5, inter-telescoping and swiveled to each other form a joint at which swiveling action occurs to permit the sound box to be turned from a position at which the stylus, 7, may

coöperate properly with a laterally-undulating or zig-zag type of record, to a position at which it may coöperate properly with a vertically-undulating or hill-and-vale type of record. The two members, 3 and 5, are connected together for this swiveling action by a stud, 9, projecting from one of them (for convenience of illustration, here shown as the inner one) engaging a groove or slot, 10, in the other member, said groove or slot extending circumferentially about 90 degrees, and having at one end a longitudinally and preferably slightly obliquely offset notch, 11, into which the stud may pass for engagement against reverse rotation of the swiveled parts. In the form shown in Figs. 1 and 2, the inter-telescoping and swiveled members, 3 and 5, are relatively dimensioned so as to form a chamber, 8, at their inter-telescoped ends, in which there is coiled about the inner one a spring, 14, having one end engaged with each of said inter-telescoped members, said spring being so coiled and tensioned as to react both axially and circumferentially upon the two members with which it is engaged, the axial action being preferably by expansion of the spring longitudinally,—that is, the spring being normally compressed, and the circumferential action being in the direction for normally holding the stud, 9, at the end of the slot, 10, opposite that which has the notch, 11. Preferably the slot in its circumferential extent is slightly oblique so that the two ends of the slot,—that is, the end of the notch at one end and the other end of the slot without the notch,—are in the same directly trans-axial plane; that is to say, the slot is slightly spiral or inclined to the axis.

The operation of the device constructed as described is that normally the stud, 9, stands at the end of the slot opposite that which has the notch, but upon the operator rotating the member, 5, with the sound box thereon, in the direction to cause the stud to traverse the slot toward the other end upon reaching the other end, the stud will be forced by the spring into the notch and the parts will be locked into position displaced 90 degrees from the original position,—that is, in the position which adapts the sound box for coöperation with the other type of record from that with which it coöperates in the first or normal position.

A modified form, preferable on some ac-

counts, is shown in Figs. 4 and 5, in which there is provided a stem, 15, extending axially through the two inter-telescoped members and engaging with said members at their elbow ends, respectively, the stem being rigid with one of said members at one of said elbows,—as illustrated at the elbow, 2, of the tone arm, and protruding through the elbow, 4, of the other member, the spring, 15^a, being coiled around the protruding end portion of said stem and engaged at one end therewith, and at the other end with the elbow member through which it protrudes. In this construction the spring is tensioned as in the other construction, namely, so that it reacts circumferentially for holding the stud at the end of the slot opposite that which has the notch and longitudinally for holding the stud engaged with the notch. A convenient method of effecting the connection and securing of the spring in this form is that illustrated wherein the end of the stem 15, which protrudes through the elbow, 4, adjacent to the sound box is squared, and a washer, 16, having a square aperture for engaging the squared stem has a pin-hole aperture, 16^a, for engaging the end of the spring, which being thus engaged therewith may be tensioned to any desired amount as by twist of about half a turn before the washer is passed onto the squared end of the stem, thereby giving the spring the desired initial tension, the washer being retained on the stem by the nut, 17, screwed onto the threaded terminal of the stem provided beyond the squared portion.

A second modification is shown in Fig. 7. In this form the spring member, 20, is made of spring wire having a coiled portion, 20^a, intermediate the end portions, 20^b, and 20^c. The elbow members, 2 and 4, have in alinement with each other exterior bosses, 21 and 22, respectively, and the elbows are pierced at the center of the bosses which are counter-bored and interiorly threaded, and have notches, 21^a and 22^a, respectively, cut through from the counterbore. The end portions, 20^b, 20^c, of the spring member, 20, are originally made long enough to protrude beyond the elbows, as seen in dotted line in Fig. 7; and the parts are assembled by inserting one end of the spring member into one of the elbow members, as, for example, the member, 4, the end of the spring being passed out through the pierced boss and the end bent down through the notch 22^a; the other elbow member is then telescoped into connection with the first, the opposite end of the spring member being passed out through the boss, 21^a, of said other elbow member, and pulled through sufficiently to tension the spring longitudinally to a degree which may be judged sufficiently to hold the two telescoped elbow members properly pressed lon-

gitudinally toward each other, and the end of the spring member is then bent down in the notch, 21^a, and the excess clipped off. The elbow member, 4, is now rotated one turn, more or less, to bring the screw hole for receiving the pin, 9, into view at the slot, 10, and the screw is then inserted in place, the rotation of said elbow member for thus registering the hole with the slot being sufficient to give the spring the necessary torsional tension to insure the pin, 9, being thrown to the end of the slot having the notch 11, as in the other form. Screws 23, 23, may be screwed into the threaded bosses, 21 and 22, respectively, merely to close the same and prevent accidental disengagement of the spring engaged with the notches. The counterboring and threading and provision of the screws in these bosses may be dispensed with if desired.

To prevent vibration of the spring member, 20, a piece of felt, 25, may be inserted into the coils, as shown.

I claim:—

1. In a phonograph in combination, a sound box, a tone arm and tubular connection from the sound box to the tone arm, comprising two inter-telescoping swiveled members, one on the tone arm and the other on the sound box; a coiled spring engaged for both axial and circumferential reaction between said inter-telescoped members, said members having one a groove or slot and the other a stud engaged therewith, said groove or slot extending circumferentially, comprising a longitudinally-offset notch at one end, the spring being circumferentially and axially tensioned for biasing the stud longitudinally in the direction of said notch and circumferentially toward the other end of the slot or groove.

2. In a phonograph in combination, a sound box, a tone arm and tubular connection from the sound box to the tone arm, comprising two inter-telescoping swiveled members, one on the tone arm and the other on the sound box; a coiled spring engaged for both axial and circumferential reaction between said inter-telescoped members, said members having one a groove or slot and the other a stud engaged therewith, said groove or slot extending circumferentially, comprising a longitudinally-offset notch at one end, the spring being circumferentially and axially tensioned for biasing the stud longitudinally in the direction of said notch and circumferentially toward the other end of the slot or groove, one of said inter-telescoped members having an axial stem, said spring being coiled around said stem and engaged at one end therewith, and at the other end with the other member.

3. In a phonograph in combination, a sound box, a tone arm and tubular connection from the sound box to the tone arm,

comprising two inter-telescoping swiveled members, one on the tone arm and the other on the sound box; a coiled spring engaged for both axial and circumferential reaction between said inter-telescoped members, said members having one a groove or slot and the other a stud engaged therewith, said groove or slot extending circumferentially, comprising a longitudinally-offset notch at one end, the spring being circumferentially and axially tensioned for biasing the stud longitudinally in the direction of said notch and circumferentially toward the other end of the slot or groove, said inter-telescoped members each having an elbow, one at its connection with the sound box, and the other at its connection with the tone arm, and a stem axial with respect to said members secured rigidly at one of said elbows and extending out through the other, the spring being coiled around the protruding end of said spring and having one end secured to the stem and the other to the member through which the stem protrudes.

4. In a phonograph, in combination, a sound box, a tone arm and tubular connection from the sound box to the tone arm, comprising two inter-telescoping swiveled

members, one on the tone arm and the other on the sound box; a coiled spring engaged for both axial and circumferential reaction between said inter-telescoped members, said members having one a groove or slot and the other a stud engaged therewith, said groove or slot extending circumferentially and comprising a longitudinally-offset notch at one end, the spring being circumferentially and axially tensioned for biasing the stud longitudinally in the direction of said notch and circumferentially toward the other end of the slot or groove, said inter-telescoped members having each an elbow, one at its connection with the sound box, and the other at its connection with the tone arm, and a stem axial with respect to said members, and at one end non-rotatably connected with one of them, the spring being combined with said stem by connection therewith for relative non-rotation at one end of the spring, and being connected at the other end with the other elbow.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 10th day of November, 1916.

CHARLES S. BURTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

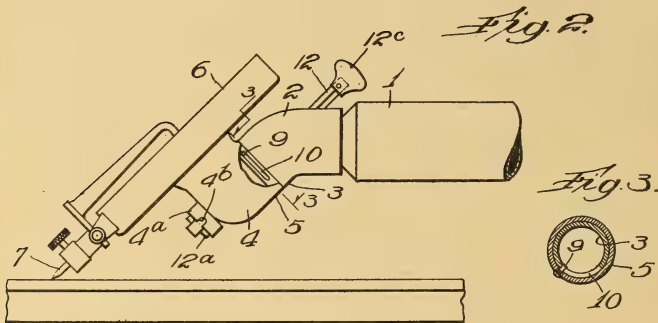
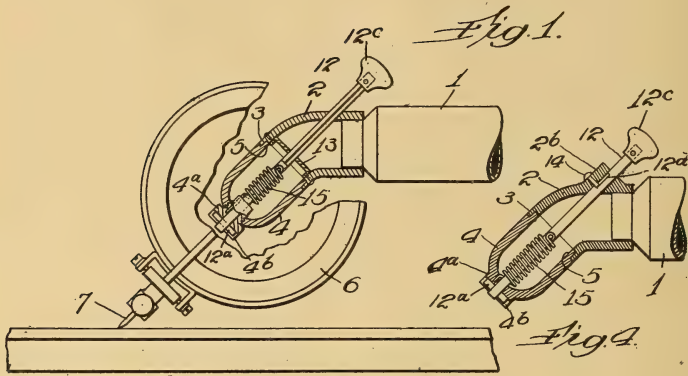
PHONOGRAPH SOUND BOX CONNECTION.

1,247,220 ----- C. S. Burton,
Patented Nov. 20, 1917.
Filed Jan. 17, 1917.

C. S. BURTON,
 PHONOGRAPH SOUND BOX CONNECTION,
 APPLICATION FILED JAN. 17, 1917.

1,247,220.

Patented Nov. 20, 1917.



Witness:
C. H. Plummer

Inventor:
 Charles S. Burton
 by *Burton Burton*
 his Attys.

UNITED STATES PATENT OFFICE.

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PHONOGRAPH-SOUND-BOX CONNECTION.

1,247,220.

Specification of Letters Patent.

Patented Nov. 20, 1917.

Application filed January 17, 1917. Serial No. 142,943.

To all whom it may concern:

Be it known that I, CHARLES S. BURTON, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonograph-Sound-Box Connections, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved connection between the sound box and the tone arm of a phonograph, adapted to permit swiveling of the two connected parts for adjustment of the sound box to two positions, and particularly adapted to permit such adjustment for zig-zag and hill-and-vale records, the specific purpose being to insure the adjustment from one position to the other being made completely and not halted with the parts at an intermediate position. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of a portion of the tone arm and sound box embodying this invention, a portion of the sound box being broken away to show other parts which are in section with respect to telescoping and swiveled members.

Fig. 2 is a similar view with the sound box in the other of the two positions to which it is adjustable for adaptation to the different types of records.

Fig. 3 is a section at the line, 3—3, on Fig. 2.

Fig. 4 is a section similar to the sectional part of Fig. 1, showing a modification in certain details.

In the drawings the free end of the swinging tone arm, 1, has an elbow, 2, whose angle is about 135 degrees, so that the terminal, 3, trends downward at a slope of about 45 degrees for inter-telescoping connection with the similarly-inclined terminal member, 5, of the elbow, 4, which leads into the center of the sound box, 6. The two members, 3 and 5, inter-telescoping and swiveled to each other form a joint at which swiveling action occurs to permit the sound box to be turned from a position at which the stylus, 7, may coöperate properly with a laterally-undulating or zig-zag type of record, to a position at which it may coöperate properly with a vertically-undulating or

hill-and-vale type of record. The two members, 3 and 5, are connected together for this swiveling action by a stud, 9, projecting from one of them, (for convenience of illustration here shown as the outer one) engaging a circumferentially-extending groove, 10, in the other member, the extent of said groove being substantially 90 degrees about the axis of the two inter-telescoped members. Extending axially through said inter-telescoped members and protruding through their respective elbows at opposite ends there is a spindle, 12, which for the purpose which it is to serve is required to be non-rotatable with respect to one of said members, and, as illustrated, it is made non-rotatable with the elbow member, 2, on the tone arm, such non-rotatable connection being conveniently afforded by making the upper end portion of said spindle square and extending it through a bridge piece, 13, in said elbow having a square opening to accommodate said squared end of the spindle. At the other end the spindle emerges through the elbow member which for that purpose has a boss, 4^a, (which is conveniently produced by means of a screw so lettered, screwed into the elbow to the head, and thereby rigid with the said elbow member) said boss having an axial aperture through which the spindle extends, and having a cross-slot, 4^b, with which a cross-pin, 12^a, of the spindle is engaged, and adapted to be disengaged by the longitudinal thrust downward of the said spindle. Within the two inter-telescoped members, a spring, 15, is coiled around the spindle, being attached to the spindle at the upper end near the squared portion and attached at the lower end to the elbow member, 4, such attachment being most conveniently made as illustrated by engaging said lower end of the spring in the screw, 4^a. The end of the spindle which protrudes above the elbow, 2, may be provided with a knob, 12^c, for convenience of thrusting it against the axial reaction of the spring, 15, which is coiled and dimensioned so as to react thus axially for thrusting the spindle upward and protruding it, or increasing its protrusion, above the elbow, 2, such longitudinal movement being stopped by the cross-pin, 12^a, engaging the bottom of the cross-slot, 4^b, in the boss, 4^a, on the elbow, 4.

The parts are assembled by first placing the spring about the spindle and securing

it at its upper end thereto, inserting the spindle down through the boss, 4^a and securing the lower end of the spring, forcing the spindle through until the pin, 12^a, can
 5 be inserted through it below the boss, 4^a, then inserting the squared end of the spindle through the bridge-piece, 13, and out through the opening in the elbow, 2, simultaneously engaging the two inter-telescoping terminals, 3 and 5, of the elbow members, and securing the knob tightly on the protruding upper end of the spindle. The lower elbow member, 4, will now be rotated about the axis of said inter-telescoping members until
 10 the spring is sufficiently tensioned circumferentially to react reliably for rotating the elbow member, 2, with respect to the elbow member, 4, against the friction of their inter-telescoping joint, bringing the circumferential slot, 10, around to a position at which the stud 9, may be inserted through the outer of said inter-telescoped members at their joint into said slot, said stud being preferably constructed with a threaded outer
 20 end portion and reduced inner end portion, so that it is screwed into said outer member for engaging its reduced end in said slot.

The operation of the device constructed as described is that initially the stud, 9, stands at one end of the slot, 10, when the sound box is in position for coöperating with one type of record, for example the zigzag or laterally undulating type; and at this position the spring by its lateral reaction holds
 30 the pin, 12^a, engaged with the cross slot, 4^b, in the boss of the elbow, 4. When the operator now presses the knob upon the upper end of the spindle downward, thrusting the spindle longitudinally for disengaging the cross-pin
 40 from the slot, the circumferential reaction of the spring rotates the lower elbow member, 4, through ninety degrees, swinging the sound box to the position for coöperating with the other type of record, carrying the stud, 9, to the opposite end of the slot, 10. When the operator desires to restore the sound box to the initial position, it may be done by taking hold of it and rotating it with the elbow member, 4, upon the axis of
 45 the inter-telescoped member until the cross-pin, 12^a, snaps into the cross-slot, 4^b, which will lock the sound box in the new position. Thus the sound box is certain to be at either one position or the other and cannot stand
 50 in any intermediate position within the range of the swiveling movement of the two inter-telescoped members.

In Fig. 4 there is shown a detail modification which consists in providing a boss at 2^b
 60 on the elbow member, 2, for affording guide bearing for the spindle, 12, and dispensing with the bridge piece, 13, the spindle being without the squared part and being held non-rotatable with respect to the elbow, 2,
 65 by a pin, 14, engaging a longitudinal groove

or slot, 12^a, in the spindle. In this form the boss, 4^a, is shown integral with the elbow member, 4. In this form the winding up of the spring to tension it for its reaction to rotate the elbow member, is effected by turning the spindle after the parts are assembled before inserting the pin, 14, in the slot, 12^a.

I claim:—

1. In a phonograph in combination, a sound box, a tone arm and tubular connections from the sound box to the tone arm comprising two inter-telescoping swiveled members, one on the tone arm and the other on the sound box; and means for limiting the relative swiveling action; a spindle substantially axial with respect to said inter-telescoped members and longitudinally movable and non-rotatable with respect to one of them; means by which said spindle is engaged with the other member against rotation relative thereto, and disengageable by said longitudinal movement; and a spring engaged for circumferential reaction between said inter-telescoped members and axial reaction between said spindle and the first mentioned of said members.

2. In a phonograph in combination, a sound box, a tone arm and tubular connections from the sound box to the tone arm, comprising two inter-telescoping swiveled members, one on the tone arm and the other on the sound box; means limiting their relative swiveling movement; a spindle extending axially within said inter-telescoping members, longitudinally movable and non-rotatable with respect to the member which is carried on the tone arm, the coiled spring having one end connected to said spindle and the other end to the other of said inter-telescoping members, and coiled for circumferential reaction between said spindle and said last-mentioned of the inter-telescoping members, said spring being also stopped on said last mentioned member for reaction axially between said member and said spindle, and a feather on said spindle which engages said last mentioned member and is disengageable therefrom by longitudinal movement of the spindle in opposition to the axial reaction of said spring, said spindle being extended out through one of said inter-telescoping members for exterior manual engagement for longitudinal actuation in opposition to said spring.

3. In a phonograph in combination with a sound box, a tone arm and tubular connections from the sound box to the tone arm, comprising two inter-telescoping swiveled members, one on the tone arm and the other on the sound box, each of said members comprising an elbow at the end opposite said inter-telescoping engagement; a spindle extending axially through said members and emerging through both said elbows, and engaged non-rotatably with the

member on the tone arm but longitudinally movable with respect to both said inter-telescoping members; means by which the spindle is engaged with the member on the
 5 sound box against relative rotation and adapted for disengagement by longitudinal movement of said spindle; a spring coiled about said spindle and engaged at one end therewith and at the other end with said
 10 sound box member for both circumferential and axial reaction between said spindle and said sound box member, the end of said spindle which protrudes from the elbow of the tone arm member being accessible for in-
 15 ward thrust in opposition to said axial reaction of the spring to disengage said spindle from the sound box member.

4. In combination with the two tubular

inter-telescoping swiveled members of the sound conduit; means limiting their swivel- 20 ing movement; an axial stem within them non-rotatable with respect to one of them and longitudinally movable with respect to both of them; means for engaging and disengaging the stem and the relatively ro- 25 tatable member by longitudinal movement of the stem, and a spring coiled about said stem and connected at one end thereto and at the other end to the relatively rotatable member, and reacting both circumferen- 30 tially for rotation of said rotatable member and engagement of the same with the stem.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 16th day of January, 1917.

CHARLES S. BURTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

LUBRICATING AND POLISHING PAD FOR TALKING
MACHINE RECORDS.

1,247,232 ----- P. B. Delany.
Patented Nov. 20, 1917.
Filed March 1, 1913.

P. B. DELANY.
LUBRICATING AND POLISHING PAD FOR TALKING MACHINE RECORDS.
APPLICATION FILED MAR. 1, 1913.

1,247,232.

Patented Nov. 20, 1917.

Fig. 1.

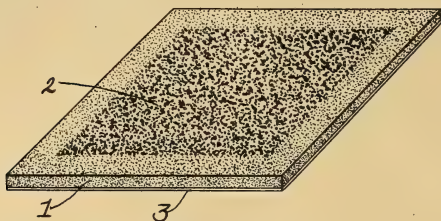
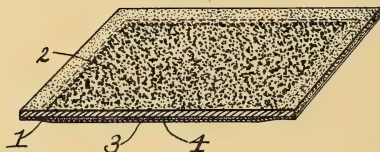


Fig. 2.



Witnesses:
L. S. Ashley
L. J. Branning

Patrick B. Delany, Inventor
By *Edward C. Davidson*
Attorney

UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF SOUTH ORANGE, NEW JERSEY.

LUBRICATING AND POLISHING PAD FOR TALKING-MACHINE RECORDS.

1,247,232.

Specification of Letters Patent.

Patented Nov. 20, 1917.

Application filed March 1, 1913. Serial No. 751,405.

To all whom it may concern:

Be it known that I, PATRICK B. DELANY, a citizen of the United States of America, residing in South Orange, county of Essex, and State of New Jersey, have invented a certain new and useful Improved Lubricating and Polishing Pad for Talking-Machine Records, of which the following is a specification.

This invention comprises a pad of peculiar construction and make up for treatment of talking machine records for the purpose of incidentally removing dust but primarily to polish or smooth and lubricate the surface of the record and lubricate the needle which traverses it.

Figure 1 is an elementary form of this device that experience has demonstrated to be highly efficient; and

Fig. 2, shows a modification.

The device comprises a pad of appropriate soft material adapted to be superficially coated or impregnated with graphite. The pad shown in the drawing may be a piece of felt, plush, corduroy, fustian or other fabric of good quality.

Applied to it is a coating 2 of graphite which is well rubbed into the surface and fibers of the pad and more or less impregnates it. Experience has shown that a pad of this character has such an effect upon the surfaces of the record as to materially improve the quality of the tones and utterances reproduced from the record. The pad is backed by a harder though flexible material 3, such as celluloid, which keeps it in shape and affords a clean and flexible foundation upon which the fingers press when the pad is used. The flexibility of the pad and its back or mounting is an important feature as it insures intimate contact between the pad and the grooves and interstices of the record not attainable with a rigidly mounted pad.

In speaking of a coating of graphite I do not mean that there is to be upon the pad a distinctive layer of graphite but what I do mean is that the graphite appears upon the surface as a discoloration, that is to say, the infinitely fine particles of graphite adhere to the fibers or threads, if such there be, superficially. Such application of graphite to the surface of the pad may be made by rubbing upon it finely flaked or powdered graphite or by rubbing the sur-

face with a block or stick of graphite of fine quality by which I mean fine flaked graphite mixed with a binder and molded into form. Coating and impregnation of materials such as described may I find be most thoroughly done by revolving a stick of graphite in a lathe or other revolving holder and enveloping it with the pad while held in the hand and turning the pad a quarter way at a time for separate treatment until the graphite has been rubbed into it in four directions thus insuring thorough coating or impregnation of the threads of the fabric on all sides to their woof or weave foundation. In this way the particles of graphite adhering to the fabric are infinitely smaller than any possible application from the powdered graphite.

The graphite which is applied to a record, rubbed with a pad prepared as described, is in impalpable condition, and the quantity adhering to the record is exceedingly small. Tests have demonstrated the fact that the surface of the record is finely polished and that although the graphite is practically imperceptible, not rubbing off when the record is handled, it affords a fine lubricant for the needle, insuring perfect reproductions of the sounds recorded.

Another and highly important feature of my invention, shown in Fig. 2, consists of providing a storage supply of the polishing or lubricating material sufficient for a long time and which is gradually supplied to the surface of the pad automatically by the movement of the non-porous back support of the pad when pressed upon by the fingers.

By reason of the pad being of a feltish character, that is composed of fibers intermingled in all possible directions, and as a felt of a fine close texture is required for the proper performance of this invention, the powdered graphite is in no way sifted through the pad but it is forced through the felt by compression and relaxation and the particles of the graphite, in passing through the pad, rub against innumerable fibers and are by abrasion rubbed into an exceedingly fine impalpable condition in substantially the same way that the outside fibers become coated by frictional contact therewith of graphite, as previously described. A similar condition of graphite is found on paper produced by the analogous rubbing operation of marking on paper with a lead pencil.

This stored supply 4 in a powdered state is placed between the central portions of the feltish pad 1 and its back 3, their edges for about half an inch being cemented together so that there can be no escape of the material laterally. This constant and automatic impregnation of the pad with the filtered or screened substance should afford the finest and purest supply of polishing and lubricating material and to a degree closely commensurate with the requirements.

I claim:

1. A pad for the treatment of talking machine records, comprising a piece of felt-like material coated on its polishing side with a dry lubricant in the form of an impalpable powder derived from abrasion of

a solid stick of lubricating material, such as graphite, by the pad.

2. A pad for treatment of talking machine records comprising a piece of felt having its fibers coated on its polishing side with a dry lubricant in the form of an impalpable powder derived from abrasion with a solid block or stick of lubricating material and an impervious back piece connected to the felt.

In testimony whereof, I have hereunto subscribed my name.

PATRICK B. DELANY.

Witnesses:

M. F. SMITH,

H. DE MOYA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."

ATTACHMENT FOR TALKING MACHINES.

1,247,441 ----- L. Moroney.
Patented Nov. 20, 1917.
Filed Feb. 6, 1917.

L. MORONEY.
ATTACHMENT FOR TALKING MACHINES.
APPLICATION FILED FEB. 6, 1917.

1,247,441.

Patented Nov. 20, 1917.

3 SHEETS—SHEET 1.

Fig. 1,

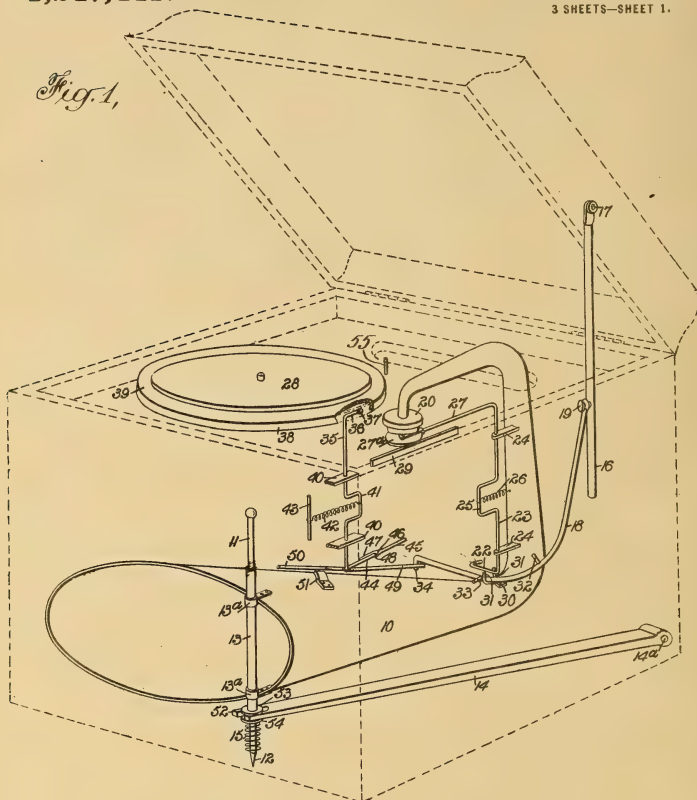
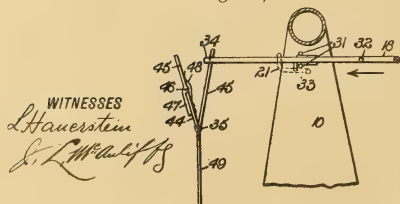


Fig. 2,



WITNESSES

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APPLICATION FILED FEB. 6, 1917.

1,247,441.

Patented Nov. 20, 1917.
3 SHEETS—SHEET 2.

Fig. 3,

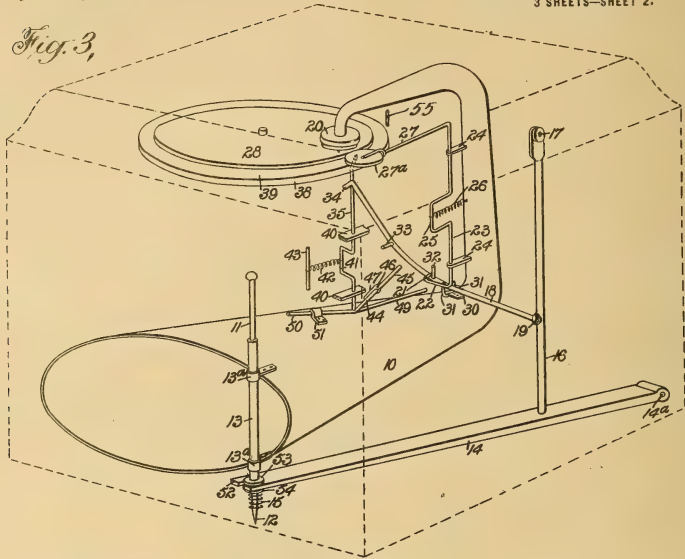


Fig. 4,

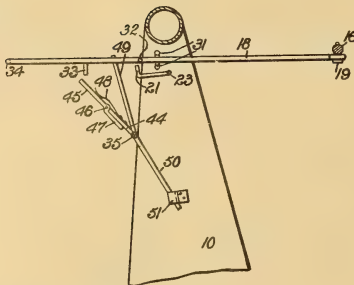
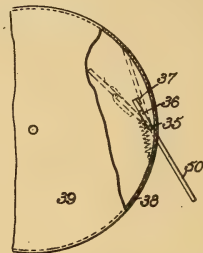


Fig. 5,



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APPLICATION FILED FEB. 6, 1917.

1,247,441.

Patented Nov. 20, 1917.
3 SHEETS—SHEET 3.

Fig. 6

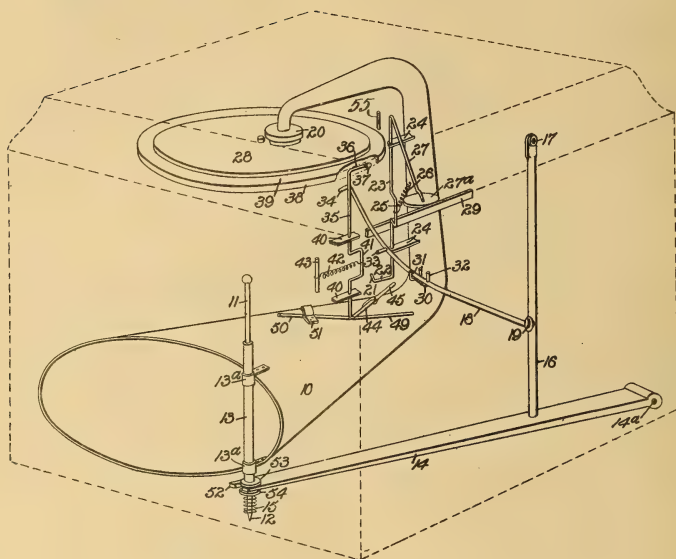
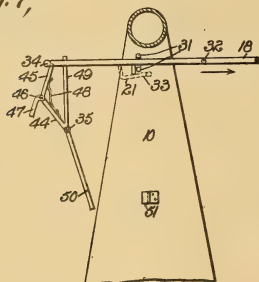


Fig. 7



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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR TALKING-MACHINES.

1,247,441.

Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed February 6, 1917. Serial No. 146,908.

To all whom it may concern:

Be it known that I, LESTER MORONEY, a citizen of the United States, and a resident of Manhattan Beach, in the county of Tillamook and State of Oregon, have invented a new and Improved Attachment for Talking-Machines, of which the following is a full, clear, and exact description.

My invention relates to a means adapted to be attached to a talking machine of the Edison type, whereby to cause the raising and lowering of the cover to perform various detail operations now required to be performed manually and which usually are found more or less irksome. The invention provides a means whereby the horn is automatically swung to bring the sound box over the record and then lowered, the operations being performed in proper sequence by the lowering of the cover, and the reverse operations taking place by the raising of the cover. The attachment includes means to automatically stop and release the turntable with the swinging of the horn, and a means automatically adjustable to the size of the record to govern the movement of the horn-actuating means.

The invention will be particularly explained in the specific description following. Reference is to be had to the accompanying drawings forming a part of this specification in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a perspective view of my attachment and indicating the cabinet of the talking machine in dotted lines, the view showing the position of the parts when the cover is in the raised position;

Fig. 2 is a fragmentary plan view to be hereinafter referred to;

Fig. 3 is a view similar to Fig. 1 with the cabinet cover lowered, certain trip elements being indicated in the positions they assume just as the cover reaches its lowermost position before the final movement of the said trip devices;

Figs. 4 and 7 are views similar to Fig. 2 but showing the parts in different positions;

Fig. 5 is a fragmentary plan view with parts broken away and in section, the view being given to show the relation of the brake device to the depending brake flange of the turntable.

Fig. 6 is a perspective view similar to Figs. 1 and 3 with the parts in the position

after the sound box has moved to the center of the record and which results in the automatic stop being brought against the turntable.

In carrying out my invention in accordance with the illustrated example, it is to be understood that the cabinet, the horn, the turntable, the motor, etc., may be those of the Edison machine or any machine of similar construction. The horn 10 as illustrated corresponds in general with the Edison horn. The same is mounted to turn in the present instance on a vertical pin 11 having a pointed lower end 12 to secure it to the cabinet. On the pin 11 is a sleeve 13 which is secured to the horn by bearing brackets 13^a having eyes embracing the said sleeve.

The numeral 14 indicates a bar pivoted at one end as at 14^a on the bottom of the cabinet and is normally sustained at its opposite end by a spring 15 on the pin 11 beneath said bar. The presser rod 16 is pivoted at its upper end to the cabinet cover as at 17 and is adapted to depress the bar 14. In connection with the presser rod 16 I provide means to swing the horn 10 prior to the depression of the bar 15. Said means may consist as shown of a lateral curved arm 18 pivoted at one end as at 19 to the rod 16 and adapted to engage a trip associated with the horn whereby to swing the latter with the pin 11 as an axis so that the sound box 20 will be disposed over the turntable.

The trip member 21 on the horn to be engaged by the arm 18 is so mounted in position as to conform to records of different diameters for which purpose said trip is in the form of a laterally bent terminal of an arm 22 which itself is at right angles or approximately so to a vertical shaft 23 adapted to turn in bearings 24 on the upright portion of the horn 10. The shaft 23 is formed with a cranked portion 25 to which one end of a retractile spring 26 is secured, the opposite end of said spring being secured to the horn 10. On the upper end of the shaft 23 is a lateral arm 27 adapted to bear by its outer end against the edge of a record 28 when the latter is in position on the turntable. Preferably, the outer end of the arm 27 carries an idler 27^a to reduce friction on the record. The numeral 29 indicates a track in the interior of the cabinet at the top against which the roller 27^a comes to a bearing in the outer position thereof.

By the described construction the lower-

ing of the cover of the cabinet from the raised position, Fig. 1, will carry the presser rod 16 downwardly toward the bearing 14. At the same time the curved arm 18 will be moved toward the horn. Said arm 18 has movement between guide pins 31 on a plate 30 secured to the horn 10 and the arm 18 carries a trip pin 32 adapted to engage the trip member 21 on the horn. The initial lowering of the cover causes no movement of the horn 10. Upon the continued lowering of the cover and the continued lateral movement of the curved arm 18, the trip 32 by engagement with the trip 21 will swing the horn on the standard 11 until the sound box 20 is positioned above the record 28. In the further lowering of the cover, the downward movement of the presser rod 16 will cause the latter to engage the bar 14 as indicated in Figs. 3 and 6, finally, depressing the said bar against the action of the spring 15 and thus permitting the horn and the sleeve 13 to lower by gravity, thereby lowering the sound box onto the record, thus putting the machine in operation in the usual manner. The movement of the horn toward the record will have brought the roller 27^a against the periphery of the record and the continued relative movement of the horn toward the record and over the same will have given a relative rearward turn to the shaft 23 so that the trip 32 will finally pass the trip 21. The turning of the shaft 23 places the spring 26 under tension, thereby creating torque in the said shaft so that when the crank 25 is swung sufficiently for the spring 26 to re-act, said spring will throw the shaft to carry the arm 27 and roller 27^a away from the record and into contact with the track 29 as in Figs. 1 and 6. It is to be understood that the position of the roller 27^a in Fig. 3 is momentary and that as a matter of fact the final closing of the cabinet will have brought the crank 25 to a position for the spring 26 to re-act and bring the roller 27^a against the rail 29 as the cover reaches the closed position. The horn with the sound box is given a return movement by the raising of the cover by reason of a second trip 33 on the arm 18 engaging one of the pins 31 on the horn, thereby restoring the described parts to the positions shown in Fig. 1.

It is to be understood that the shaft 23 and spring 26 are normally in unstable equilibrium and the relative positions of the member 22 and the adjacent pin 31 are such that the shaft 23 may turn only in one direction to disturb the equilibrium and permit the spring 26 to act. Thus, there can be no turning of the shaft 23 under the action of the spring 26 in a direction toward the turntable.

The means for controlling the stop or brake is also actuated by the movement of the arm 18 upon the lowering of the cabinet

cover for which purpose the said arm 18 has a depending trip member 34 at the free end thereof which is caused to turn an upright shaft 35 having at its upper end a lateral arm 36 formed with a head or other suitable bearing member 37 adapted to bear against the depending flange 38 of the turntable 39 upon the turning of the said stop shaft 35. The said shaft turns in bearings 40 on the cabinet and it is formed with a cranked portion 41 to which one end of a retractile spring 42 is secured, the opposite end of the spring being secured to any fixed element 43 on the cabinet.

The means to turn the stop shaft 35 by the trip 34 is as follows: On the lower end of said shaft 35 is a lateral trip arm 44, the outer end 45 of which is pivoted as at 46 so that said end may yield in one direction. Movement in the opposite direction is prevented by the member 47 bearing against the relatively fixed portions of the stop arm 44 and the spring 48 tends to normally maintain the pivoted end 45 in alinement with the fixed member.

By the described arrangement as the trip 34 engages the member 45, the shaft 35 will be turned to throw the bearing member 37 away from the flange 38 of the turntable, thereby permitting the latter to turn. As the shaft 35 is turned to remove the stop from the turntable, the spring 42 will be placed under tension until the cranked portion 41 is brought to a position to permit the re-action of the said spring to so turn the shaft 35 as to maintain the stop away from the turntable. In the return movement of the arm 18, the trip 34 will engage a second lateral trip arm 49 on the shaft 35, thereby turning said shaft in a direction to cause the bearing member 37 to approach the flange 38 of the turntable and at the same time cause the spring 42 to be again placed under tension until the cranked portion is brought to a position to permit a re-action of said spring to positively throw the shaft 35 so as to bring the bearing member 37 against the flange 38. In order that when the sound box 20 reaches the center of the record, the stop will automatically be applied to arrest the movement of the turntable independently of the raising of the cabinet cover, a third arm 50 may be provided on the shaft 35 as shown; said arm is adapted to be engaged by a trip member 51 rigid with the horn 10 and so positioned that the arm 50 will be engaged thereby to turn the shaft 35 for putting the spring 42 under tension and applying the stop when the sound box has reached its inner position relatively to the record.

Comparing Figs. 2, 4 and 7, it will be clear that a movement of the arm 18 to the left, as indicated by the arrow Fig. 2, due to the closing of the cover, will cause the

trip 34 to engage the trip arm 44, 45, thereby turning the shaft 35 until the spring 42 has finally thrown the shaft to bring the several trips to the position shown in Fig. 4.

5 In this movement of the arm 18, the yielding end 45 of the trip 44 will be rigid and the raising of the cover, if the trip 44, 45 remains in the position shown in Fig. 4, will simply cause the trip 33 to engage a pin 31 and return the horn to the original position and cause the trip 34 to engage the trip arm 49 for restoring the stop shaft 35. If, however, the automatic trip elements 50, 51 are employed and have given a return rocking movement to the shaft 35, the trip 44, 45 will have been brought into the return path of the trip 34 in which case the element 45 will yield as indicated in Fig. 7 to permit the trip 34 to pass the said element 45.

20 The numeral 52 indicates the forked end of the bar 14, the members of the fork passing each side of the standard 11 between an upper collar or shoulder 53 on the lower end of the sleeve 13, and a lower shoulder or collar 54 on the standard 11 above the spring 15.

I provide a vertical pin 55 in the cabinet adjacent to the edge of the turntable and so located that when the machine is closed for the last time and there is no record on the turntable, the said pin 55 will engage the arm 27 to give the necessary rearward movement thereof relatively to the horn to place the spring 26 under tension and permit the spring by its re-action to turn the shaft 23 and return the arm 27 thereof to the rail 29 in the same manner as this operation is performed by the engagement of the element 27^a with a record on the turntable.

40 It will be clear from the foregoing that my attachment performs automatically the swinging of the horn and sound box by the opening and closing of the cabinet cover without the irksome manual operations, ordinarily required, and at the same time the stop or brake is automatically released and applied.

I wish to state in conclusion that although the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the mechanical details herein illustrated since manifestly the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

55 Having thus described my invention, I claim as new, and desire to secure by Letters Patent:

1. An attachment for talking machines, including horn-controlling means, and operating means therefor operable by the cabinet cover.

2. An attachment for talking machines, comprising means operable by the cover of the machine to shift the horn of the ma-

chine laterally and cause vertical movement thereof to and from the operative position.

3. In an attachment for talking machines, means to mount the horn to swing and to have vertical movement, means to sustain the horn against vertical movement, and means attachable to the cover of the machine and adapted to swing the horn on its pivot and control the horn-sustaining means to cause vertical movement of the horn.

4. In an attachment for talking machines, means to mount the horn for lateral swinging movement and for bodily vertical movement, and means operable by the cover of the machine to swing the horn and then cause vertical movement thereof by the closing of the cover and cause vertical movement and swinging of the horn in sequence by the raising of the cover.

5. An attachment for talking machines comprising horn-controlling means operable by the cabinet cover and including co-acting trip elements applicable respectively to the horn and to the cover, and means dependent on the size of the record and engageable with the latter to vary the position of the trip element associated with the horn.

6. An attachment for talking machines, including horn-controlling means, stop means for the turntable of the machine, and means operable by the raising and lowering of the cover of the machine to actuate the first two-mentioned means.

7. In an attachment for talking machines of the type having a horn mounted to swing laterally and to rise and fall; means to effect the swinging and vertical movements of the horn, said means including a rock shaft, means to mount said shaft on the horn to move therewith toward and from the turntable of the machine, a trip member on the shaft, a lateral arm on said shaft adapted to engage the periphery of any record on the turntable whereby to position the said trip member according to the size of the record, an actuating element attachable to the cover of the machine to be raised and lowered therewith, trip means controlled by said actuating element to engage the trip member of the rock shaft, to swing the horn, and means controlled by said actuating element and controlling the vertical movement of the horn.

8. In an attachment for talking machines of the type having a horn mounted to swing laterally and to rise and fall; a rock shaft, means to mount said shaft on the horn to move bodily with the latter toward or from the turntable of the machine, a trip member on said shaft, an arm on the shaft adapted to engage any record on the turntable to position the trip member according to the size of the record, trip means to engage the trip member on the shaft to swing the horn, a spring adapted to be placed under tension

by the rocking of the said shaft in a direction away from the turntable by contact of the shaft arm with a record, the spring being adapted by its re-action to cause a further turning movement of the shaft after a given movement thereof, whereby to swing the shaft arm entirely away from the record, means operable by the raising and lowering of the cover to actuate the last-mentioned trip means, and means controlled by the said actuating means and controlling the vertical movement of the horn.

9. In an attachment for talking machines, having a horn mounted to swing laterally and to rise and fall; means controlled by the raising and lowering of the cover of the machine to swing the horn and cause vertical movements thereof, and stop means for the turntable of the machine, said last-mentioned means being controlled by the raising and lowering of the said cover.

10. In an attachment for talking machines having a horn mounted to swing laterally and to rise and fall; means controlled by the raising and lowering of the cover of the machine to swing the horn and cause vertical movements thereof, a shaft, and stop means on said shaft to arrest or permit the movement of the turntable, a spring adapted to be placed under tension by a given turning movement of the shaft in either direction and adapted by its re-action to throw the shaft in a direction to cause the said stop to release or engage the turntable, and trip means controlled by the raising and lowering of the cover of the machine to rock said shaft in opposite directions.

11. In an attachment for talking machines having a horn mounted to swing laterally and to rise and fall; means controlled by the raising and lowering of the cover of the machine to swing the horn and cause vertical movements thereof, a shaft, and stop means on said shaft to arrest or permit the movement of the turntable, a spring adapted to be placed under tension by a given turning movement of the shaft in either direction and adapted by its re-action to throw the shaft in a direction to cause the said stop to release or engage the turntable, and trip means controlled by the raising and lowering of the cover of the machine to rock said shaft in opposite directions; together with means to automatically turn said shaft by the swinging movement of the horn to automatically apply the said stop for arresting the movement of the turntable.

12. In an attachment for talking machines having a horn adapted to swing laterally and to be raised and lowered, a standard adapted to be positioned in the machine in the cabinet thereof, means to mount the horn on the said standard for swinging and vertical movements, a depressible bar pivoted at one end and adapted at its other end to sustain the horn in raised position, a spring normally tending to raise the said depressible bar, and means operable by the raising and lowering of the cover of the machine to swing said horn and to engage and disengage the depressible bar for causing vertical movement of the horn.

LESTER MORONEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPHS.

1,247,587 ----- C. C. Shigley.

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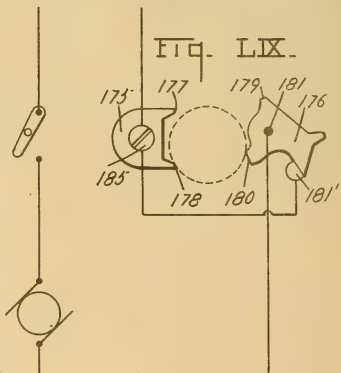
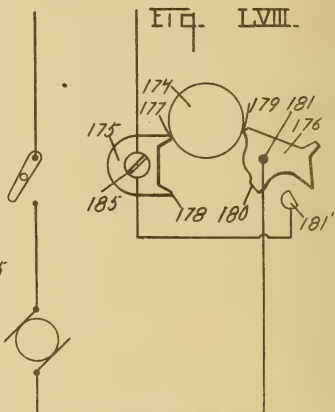
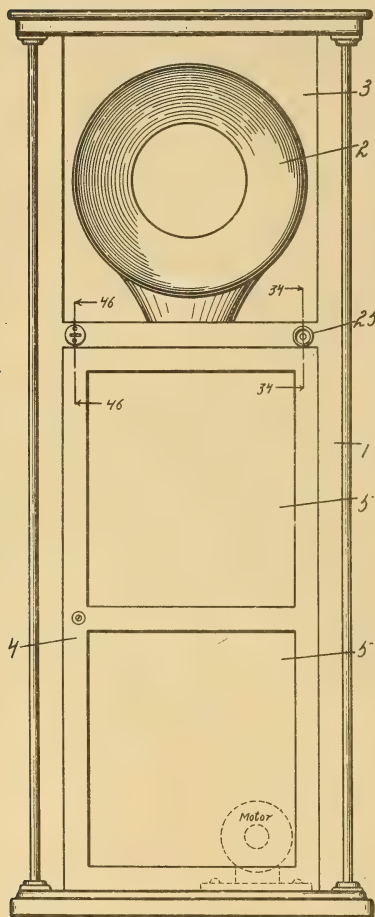
Patented Nov. 20, 1917.

Filed Nov. 12, 1916.

C. C. SHIGLEY.
 PHONOGRAPH.
 APPLICATION FILED NOV. 10, 1916.

1,247,587.

Patented Nov. 20, 1917.
 18 SHEETS—SHEET 1.



WITNESSES: **Fig. I.**
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PHONOGRAPH.

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Patented Nov. 20, 1917.

18 SHEETS—SHEET 2.

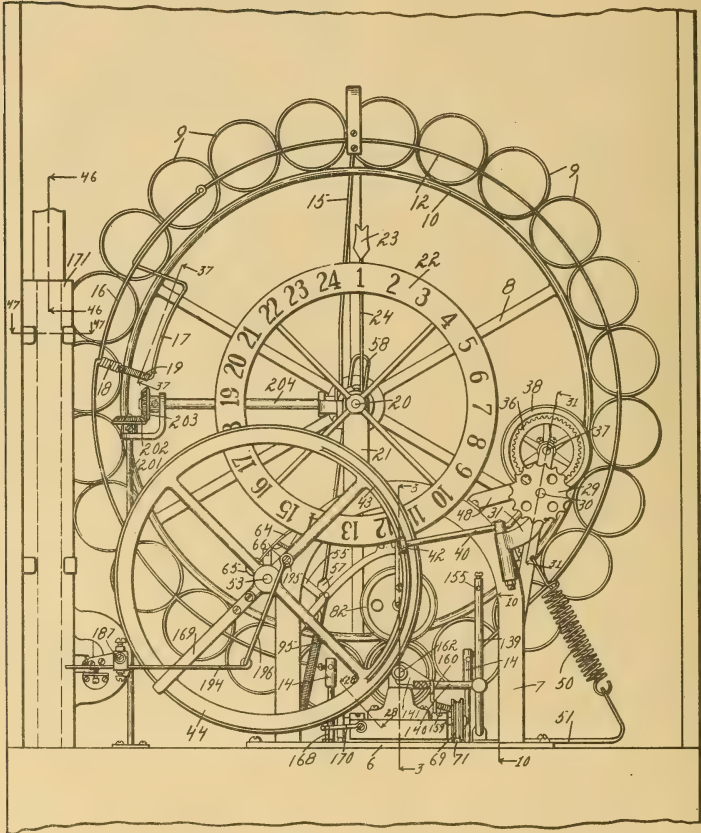


FIG. II.

WITNESSES:
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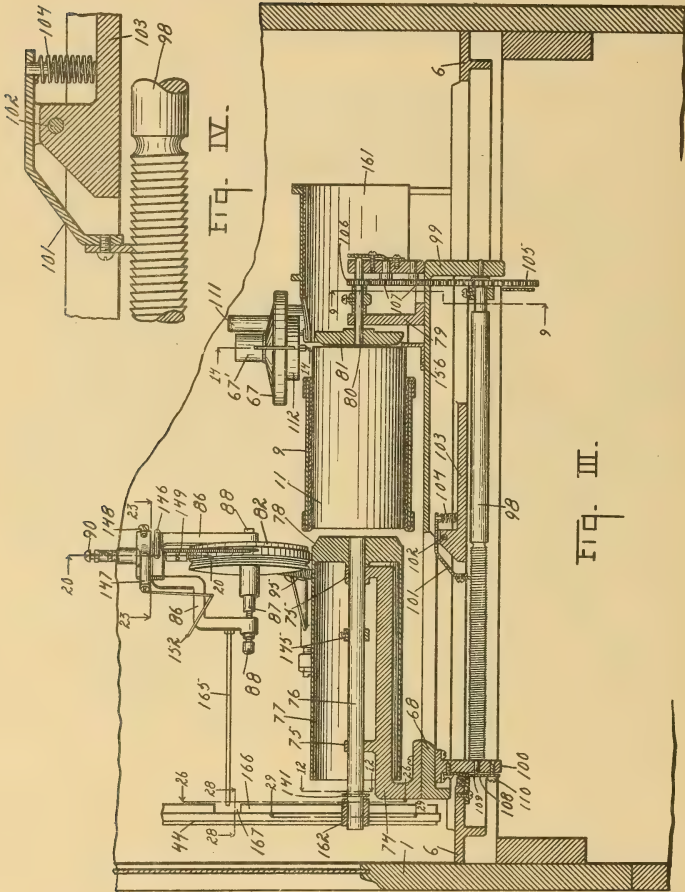
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PHONOGRAPH.

APPLICATION FILED NOV. 10, 1916.

1,247,587.

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18 SHEETS—SHEET 3.



WITNESSES:
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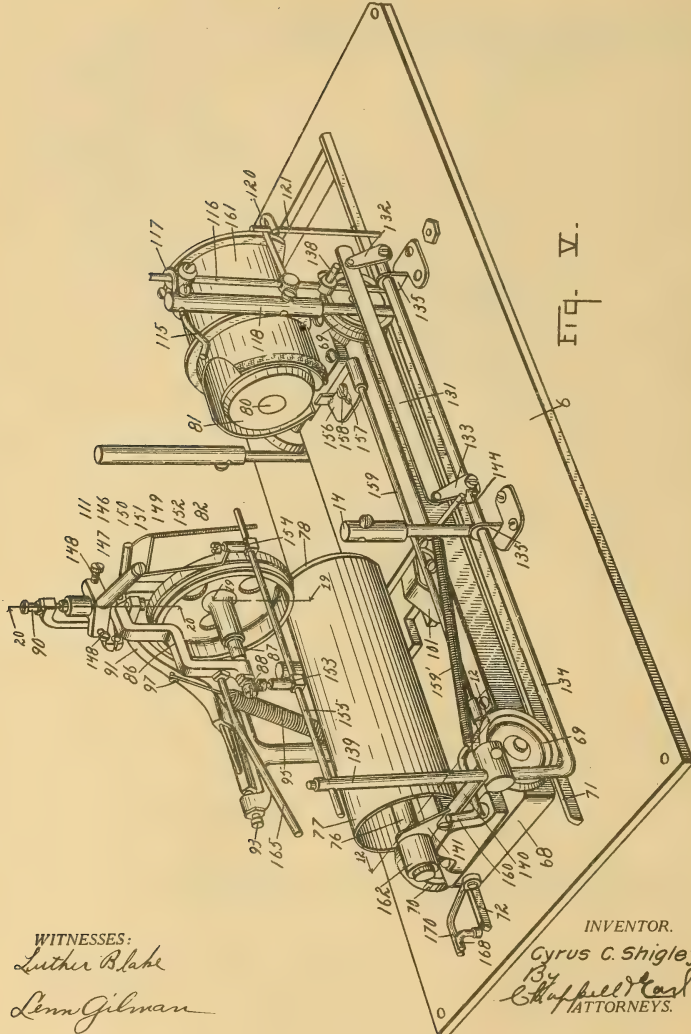
C. C. SHIGLEY.
PHONOGRAPH.

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Patented Nov. 20, 1917.

18 SHEETS—SHEET 4.



WITNESSES:

Luther Blake

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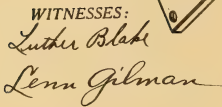
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Patented Nov. 20, 1917.
18 SHEETS—SHEET 5.



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18 SHEETS—SHEET 6.

FIG. VIII.

FIG. IX.

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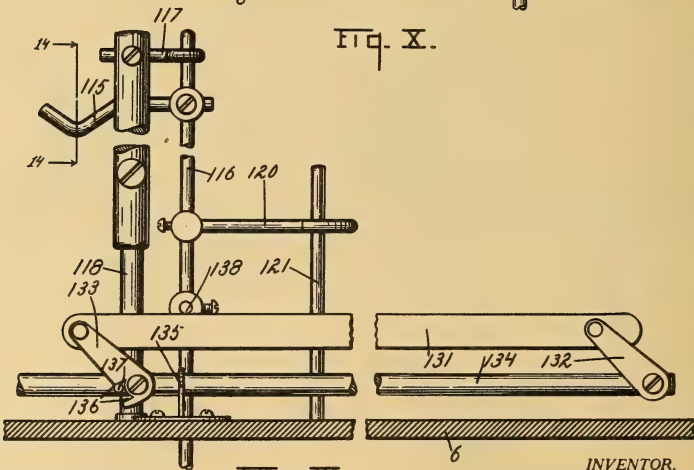
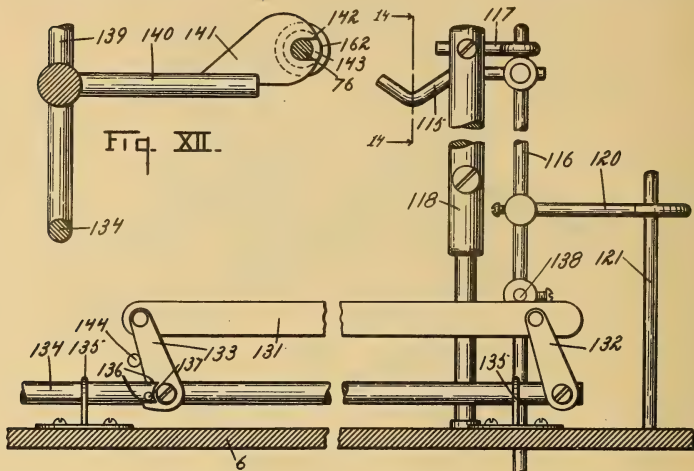
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APPLICATION FILED NOV. 10, 1916.

1,247,587.

Patented Nov. 20, 1917.

18 SHEETS—SHEET 7.



WITNESSES:
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FIG. XI.

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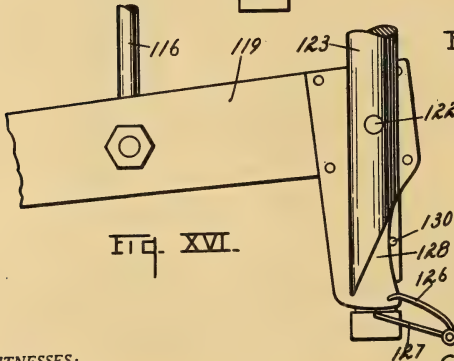
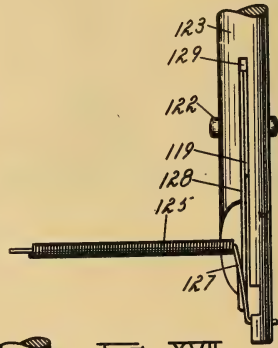
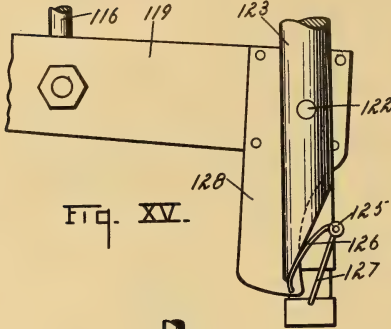
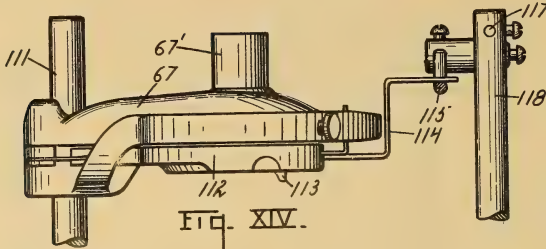
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APPLICATION FILED NOV. 10, 1916.

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18 SHEETS—SHEET 8.

1,247,587.



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Patented Nov. 20, 1917.

18 SHEETS—SHEET 9.

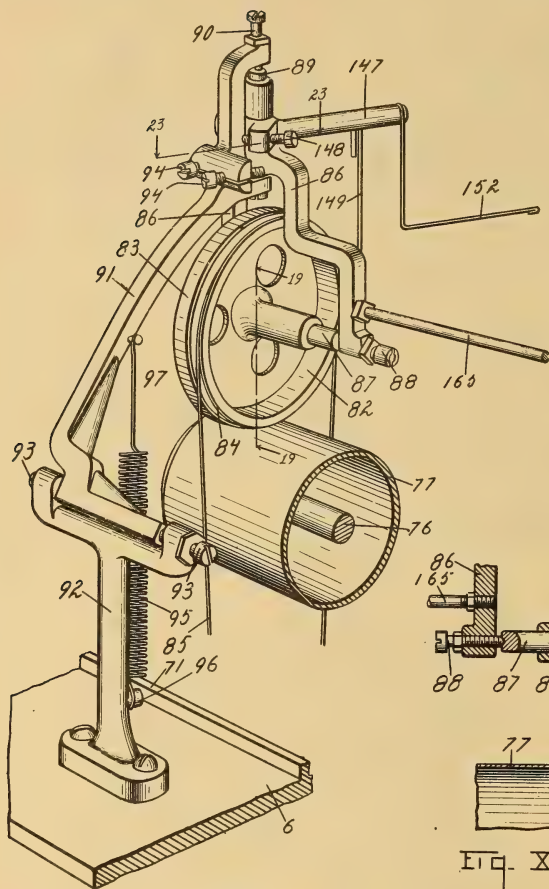


FIG. XVIII.

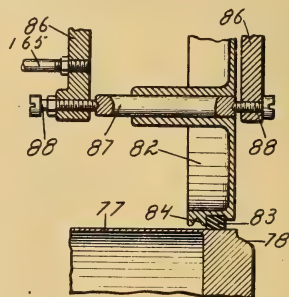


FIG. XIX.

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Patented Nov. 20, 1917.

18 SHEETS—SHEET 19.

Fig. XXI.

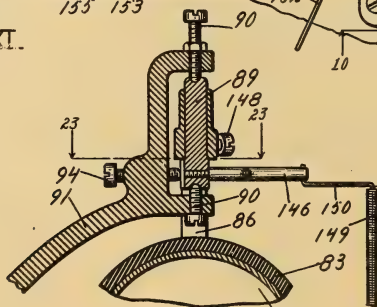


Fig. XX.

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APPLICATION FILED NOV. 10, 1916.

Patented Nov. 20, 1917.
18 SHEETS—SHEET 11.

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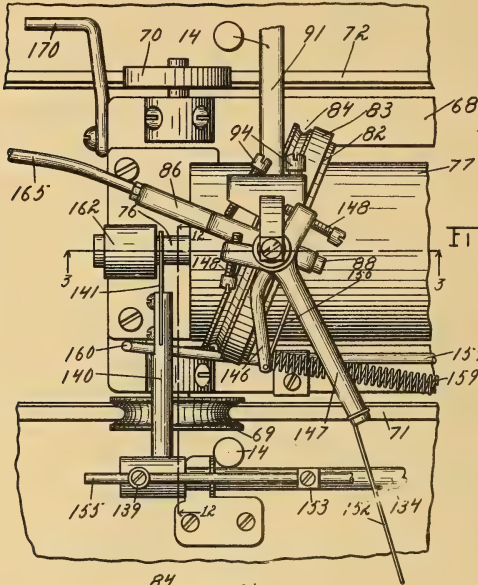


FIG. XXII.

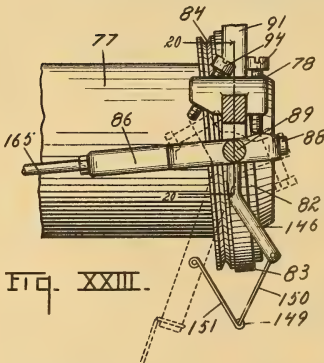


FIG. XXIII.

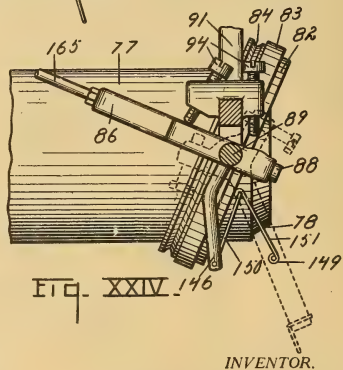


FIG. XXIV.

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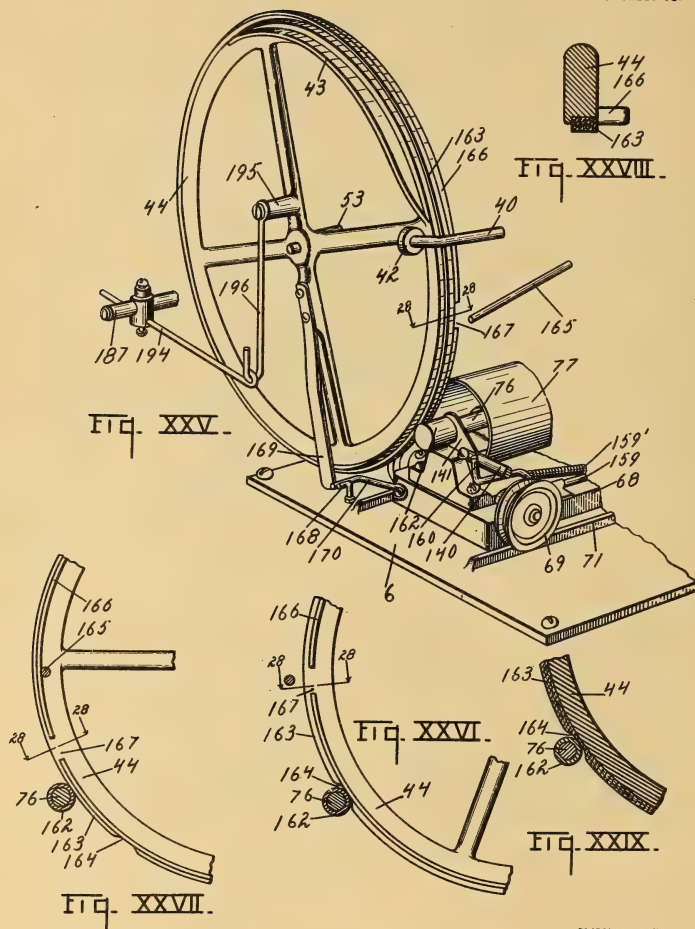
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1,247,587.

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18 SHEETS—SHEET 12.



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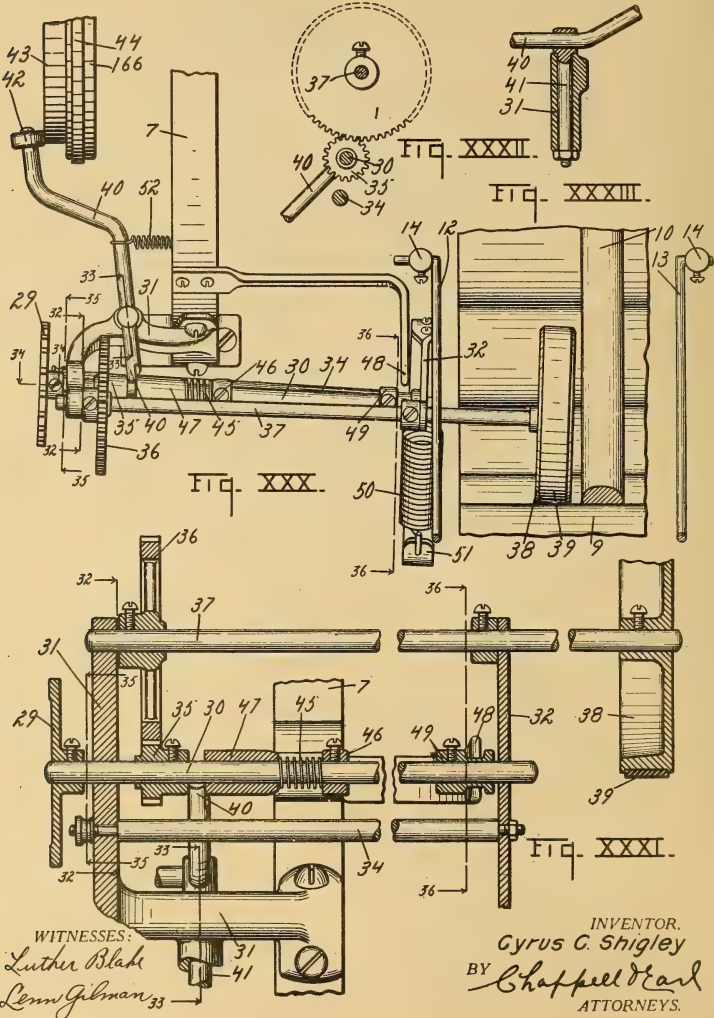
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Patented Nov. 20, 1917.

18 SHEETS—SHEET 13.



C. C. SHIGLEY.
PHONOGRAPH.

APPLICATION FILED NOV. 10, 1916.

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Patented Nov. 20, 1917.

18 SHEETS—SHEET 14.

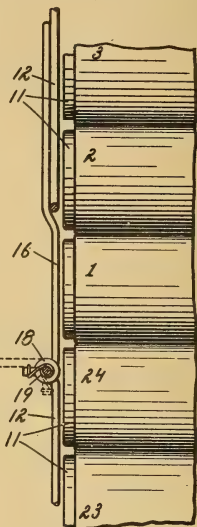
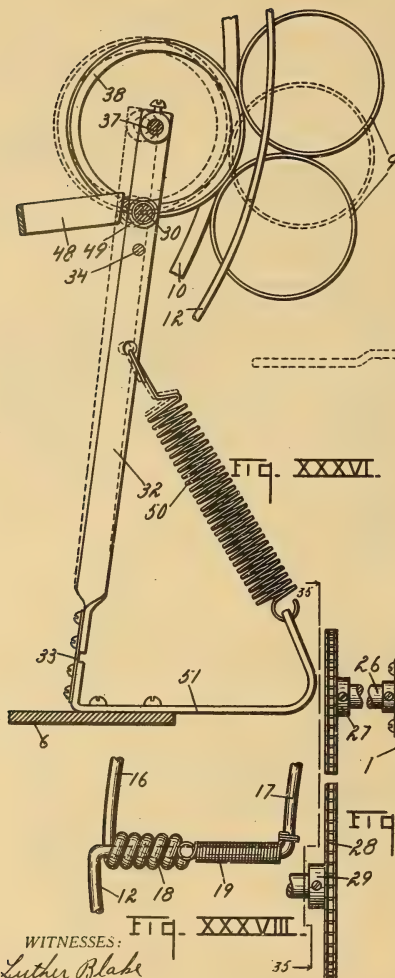


Fig. XXXVII.

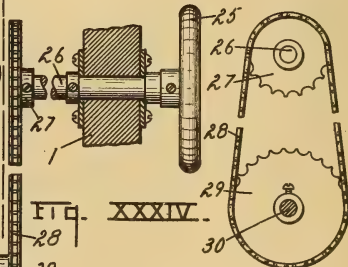


Fig. XXXV.

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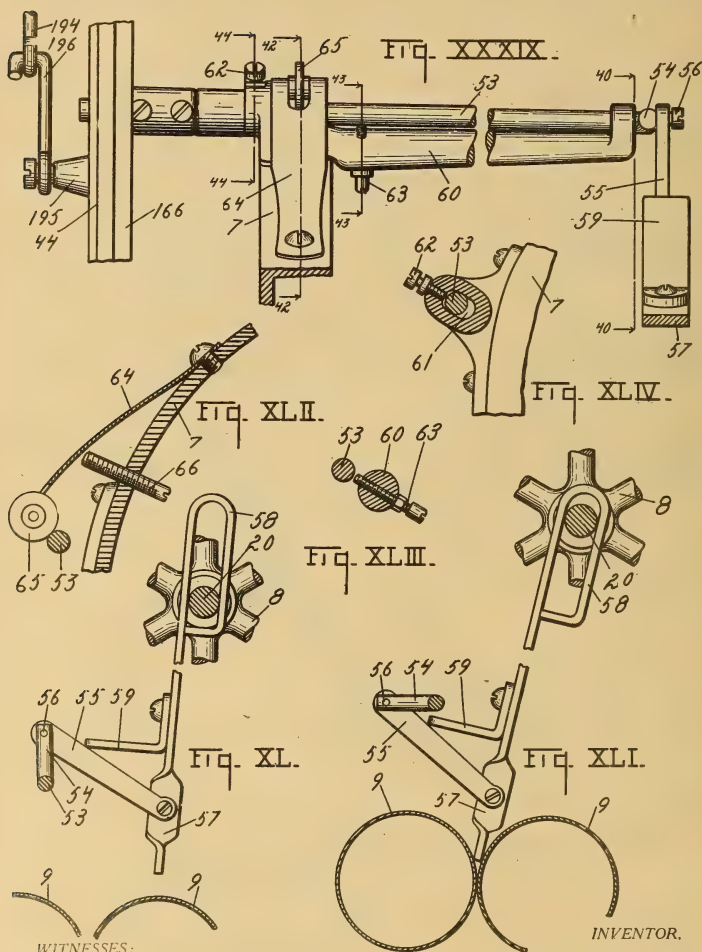
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APPLICATION FILED NOV. 10, 1916.

1,247,587.

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18 SHEETS—SHEET 15.



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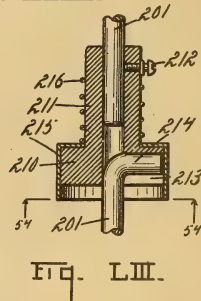
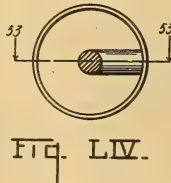
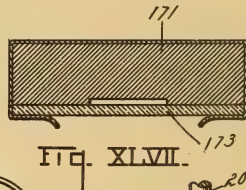
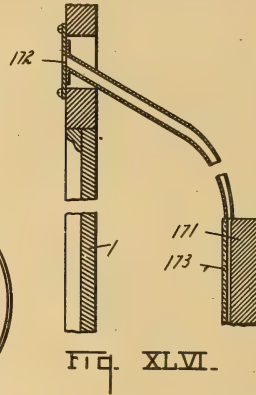
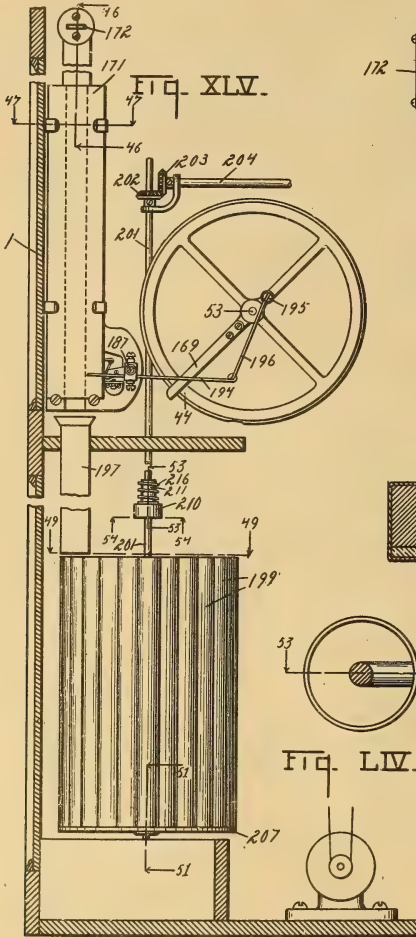
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PHONOGRAPH.

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1,247,587.

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18 SHEETS—SHEET 16.



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APPLICATION FILED NOV. 10, 1916.

Patented Nov. 20, 1917.
18 SHEETS—SHEET 17.

1,247,587.

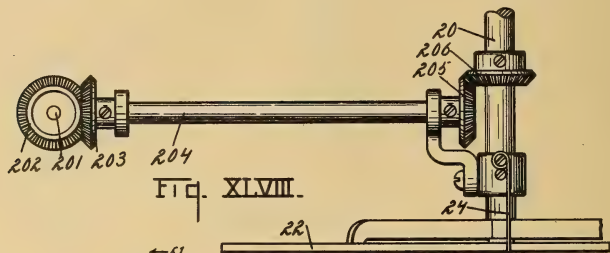


FIG. XLVIII.

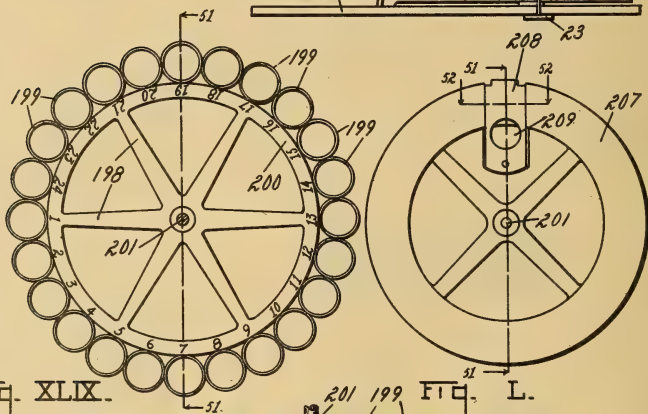


FIG. XLIX.

FIG. L.

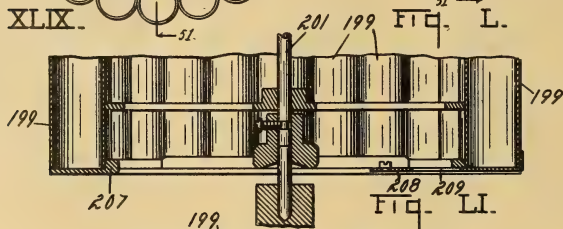


FIG. LI.

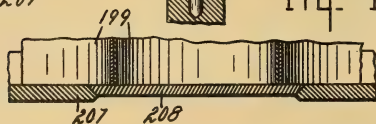


FIG. LII.

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PHONOGRAPH.

APPLICATION FILED NOV. 10, 1916.

1,247,587.

Patented Nov. 20, 1917.

18 SHEETS—SHEET 18.

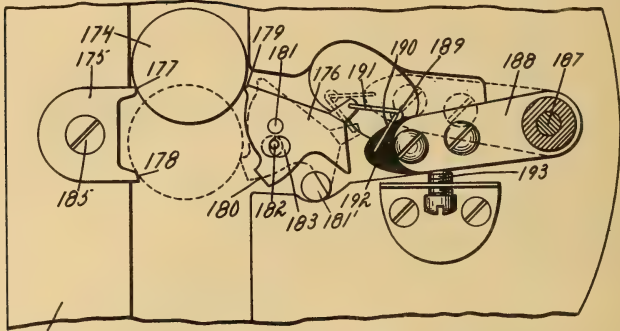


FIG. LV.

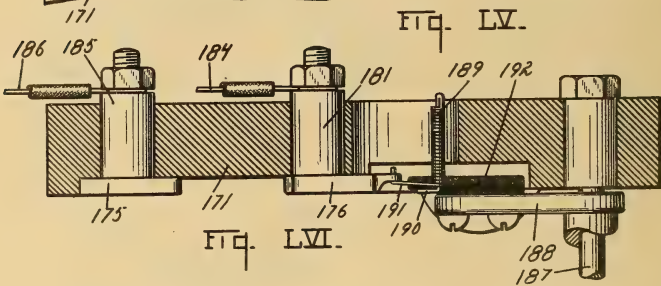


FIG. LVI.

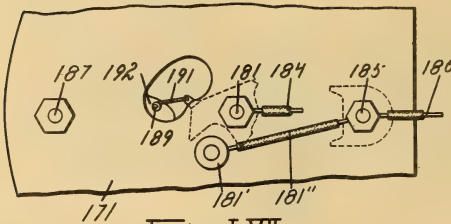


FIG. LVII.

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1,247,587.

Specification of Letters Patent.

Patented Nov. 20, 1917.

Application filed November 10, 1916. Serial No. 130,626.

To all whom it may concern:

Be it known that I, CYRUS C. SHIGLEY, a citizen of the United States, residing at Grand Rapids, county of Kent, State of Michigan, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates to improvements in phonographs.

The main objects of this invention are:

First, to provide an improved magazine phonograph which is automatic in its operation.

Second, to provide in a magazine phonograph an improved magazine actuating means providing for its automatic actuation or manual actuation to select the record desired.

Third, to provide in a phonograph an improved record drive and feed means.

Fourth, to provide in a phonograph an improved control mechanism.

Fifth, to provide an improved coin controlled magazine phonograph which is entirely automatic in its operation for the playing of successive records and one which is comparatively simple and durable in structure.

Sixth, to provide in a phonograph an improved magazine or record carrier phonograph.

Seventh, to provide in a phonograph an improved coin receptacle.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I, Sheet 1, is a front elevation of a structure embodying the features of my invention.

Fig. II, Sheet 2, is a detail front elevation with the front of the casing partially broken away, showing the general arrangement of the mechanism.

Fig. III, Sheet 3, is an enlarged detail section on a line corresponding to line 3—3 of Figs. II, VI, IX, XXI, and XXII, showing details of the record supporting, feeding and driving mechanism.

Fig. IV, Sheet 3, is an enlarged detail section of parts of the record feeding mechanism, taken on a line corresponding to line 4—4 of Fig. VI.

Fig. V, Sheet 4, is a perspective view of the record supporting and feeding mechanism.

Fig. VI, Sheet 5, is a detail perspective view of the carriage portion of the record supporting and feeding mechanism.

Fig. VII, Sheet 5, is an enlarged detail section on a line corresponding to line 7—7 of Fig. VI, showing details of the record feeding mechanism.

Fig. VIII, Sheet 6, is a detail perspective view, showing further details of the record supporting mechanism.

Fig. IX, Sheet 6, is a detail section on a line corresponding to line 9—9 of Fig. III, showing details of the reproducer raising and lowering mechanism.

Fig. X, Sheet 7, is a detail section on a line corresponding to line 10—10 of Figs. II, IX, and XXI, showing further details of the reproducer actuating mechanism, the parts being shown in raised position.

Fig. XI, Sheet 7, is a detail section corresponding to that of Fig. X, with the parts in lowered position.

Fig. XII, Sheet 7, is a detail section on a line corresponding to line 12—12 of Figs. III, V, XXI and XXII, showing further details of the reproducer raising mechanism.

Fig. XIII, Sheet 5, is a detail section on a line corresponding to line 13—13 of Fig. VIII, showing one portion of the record support.

Fig. XIV, Sheet 8, is an enlarged detail of the reproducer raising and lowering mechanism, partially in section, on a line corresponding to line 14—14 of Figs. III, X and XI.

Fig. XV, Sheet 8, is an enlarged detail of parts of the reproducer raising and lowering mechanism shown in Fig. IX.

Fig. XVI, Sheet 8, is a detail view corre-

sponding to that of Fig. XV, with the parts in another position.

Fig. XVII, Sheet 8, is a view of the parts shown in Fig. XV, looking from the left thereof.

Fig. XVIII, Sheet 9, is an enlarged detail perspective view of the record driving mechanism.

Fig. XIX, Sheet 9, is a detail section on a line corresponding to line 19—19 of Figs. V and XVIII, showing further details of the record driving mechanism.

Fig. XX, Sheet 10, is a detail section on a line corresponding to line 20—20 of Figs. III, V, XXI, and XXIII, showing details of the driving mechanism.

Fig. XXI, Sheet 10, is a detail plan view of the record driving mechanism.

Fig. XXII, Sheet 11, is a detail plan view of parts of the feed mechanism shown in Fig. XXI, in reverse driving position.

Fig. XXIII, Sheet 11, is a detail section on a line corresponding to line 23—23 of Figs. III, XVIII, and XX, showing details of the feed reversing mechanism.

Fig. XXIV, Sheet 11, is a detail view corresponding to that of Fig. XXIII, showing the reversing mechanism shown in that figure in another position.

Fig. XXV, Sheet 12, is a detail perspective view of the automatic coin controlled starting and control mechanism.

Fig. XXVI, Sheet 12, is a detail section on a line corresponding to line 25—26 of Fig. III, with the automatic coin controlled starting mechanism, the parts being shown in actuated position.

Fig. XXVII, Sheet 12, is a detail section corresponding to that of Fig. XXVI, with the parts in neutral position.

Fig. XXVIII, Sheet 12, is a detail section on a line corresponding to line 28—28 of Figs. II, III, XXV, XXVI and XXVII, showing further details of the control mechanism.

Fig. XXIX, Sheet 12, is a detail section on a line corresponding to line 29—29 of Fig. III.

Fig. XXX, Sheet 13, is a detail plan view of the record magazine shifting mechanism.

Fig. XXXI, Sheet 13, is a detail sectional view on a line corresponding to line 31—31 of Fig. II, showing further details of the record magazine shifting mechanism.

Fig. XXXII, Sheet 13, is a detail section on a line corresponding to line 32—32 of Figs. XXX and XXXI, showing further details of the record magazine control mechanism.

Fig. XXXIII, Sheet 13, is a detail section on a line corresponding to line 33—33 of Figs. XXX, and XXXI.

Fig. XXXIV, Sheet 14, is a detail section on a line corresponding to line 34—34 of

Figs. I, and XXX, showing further details of the record shifting mechanism.

Fig. XXXV, Sheet 14, is a detail section on a line corresponding to line 35—35 of Figs. XXX, XXXI and XXXIV.

Fig. XXXVI, Sheet 14, is a detail section on a line corresponding to line 36—36 of Figs. XXX and XXXI.

Fig. XXXVII, Sheet 14, is a detail section on a line corresponding to line 37—37 of Fig. II, showing details of the record magazine.

Fig. XXXVIII, Sheet 14, is an enlarged detail side view of parts of the record magazine shown in Fig. XXXVII.

Fig. XXXIX, Sheet 15, is a detail plan view of parts of the automatic record shifting mechanism.

Fig. XL, Sheet 15, is a detail section on a line corresponding to line 40—40 of Fig. XXXIX, showing further details of the automatic record shifting mechanism.

Fig. XLI, Sheet 15, is a detail section corresponding to that of Fig. XL, with the parts in actuated position.

Fig. XLII, Sheet 15, is a detail section on a line corresponding to line 42—42 of Fig. XXXIX.

Fig. XLIII, Sheet 15, is a detail section on a line corresponding to line 43—43 of Fig. XXXIX.

Fig. XLIV, Sheet 15, is a detail section on a line corresponding to line 44—44 of Fig. XXXIX.

Fig. XLV, Sheet 16, is a detail elevation, the casing parts being shown in section, of the coin control mechanism.

Fig. XLVI, Sheet 16, is a detail section through the coin chute, on a line corresponding to line 46—46 of Figs. I, II and XLV.

Fig. XLVII, Sheet 16, is a detail section on a line corresponding to line 47—47 of Figs. II and XLV, showing details of the coin chute.

Fig. XLVIII, Sheet 17, is a detail plan view of the coin receptacle driving mechanism.

Fig. XLIX, Sheet 17, is a detail section on a line corresponding to line 49—49 of Fig. XLV.

Fig. L, Sheet 17, is a bottom view of the coin receptacle.

Fig. LI, Sheet 17, is a detail vertical section on a line corresponding to line 51—51 of Figs. XLV, XLIX and L.

Fig. LII, Sheet 17, is a detail section on a line corresponding to line 52—52 of Fig. L.

Fig. LIII, Sheet 16, is a detail section on a line corresponding to line 53—53 of Figs. XLIV and XLV.

Fig. LIV, Sheet 16, is a detail section on a line corresponding to line 54—54 of Figs. XLV and LIII.

Fig. LV, Sheet 18, is an enlarged detail view of the coin control mechanism.

Fig. LVI, Sheet 18, is a detail view of the coin control mechanism, parts being shown in section.

Fig. LVII, Sheet 18, is a rear elevation of the parts shown in Figs. IV and V.

Fig. LVIII, Sheet 1, is a diagrammatic view showing the wiring of the coin control mechanism.

Fig. LVIX, Sheet 1, is another diagrammatic view of the parts shown in Fig. LVIII in another position.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the casing 1 is of suitable design and size to receive the mechanism which is entirely inclosed therein, with the exception of the horn 2, which is disposed in an upper compartment 3 of the casing open at the front.

The door 4 of the cabinet may be provided with glass panels 5. The structural details of the cabinet, however, form no part of this invention.

The mechanism is mainly carried by a base plate 6 having a pair of spaced yoke-like uprights 7 by which the operating mechanism is mainly supported. The details of the supporting frame are, however, unimportant.

The record magazine is in the form of a wheel 8 having a plurality of cylindrical open ended record holders 9 secured upon its rim 10 side by side. These cylindrical record holders are open at both ends and are of such diameter that the records 11 are held loosely therein so that they may be easily introduced by an endwise movement and picked up by the record supporting and feeding mechanism as the records are played and automatically replaced after they are played.

The records are retained within the holders or prevented from falling therefrom accidentally by the annular guards 12 and 13 supported at the ends of the record holders. These guards 12 and 13 (see Figs. II and XXX) are preferably formed of wire. The front guard 12 is supported at its under side by the posts 14 and the rear guard 13 similarly supported. A yoke-like arm or bracket 15 projects from the rear standard 7 of the frame over the magazine to support the upper sides of the guards. The front guard 12 is provided with a gate 16 for the introduction and removal of records from the record holders (see Figs. II, XXXVII and XXXVIII). When this gate is closed it forms a continuation of the guard 12. The guard 12 is provided with

an offset 17, and the gate, which is also formed of wire, has a coil 18 embracing one end of the offset to swing thereon.

A coiled spring 19 is mounted on the offset and engaged at one end with the gate and at the other with the offset so as to hold the gate closed under spring tension.

With the parts thus arranged the records can be easily introduced or removed from the holders of the magazine.

The magazine is mounted on the shaft 20 carried by the extensions 21 of the frame standards 7. On the front end of this shaft is an index wheel 22 having numerals or other suitable indicia indicating the several magazine holders which preferably have corresponding indicia (see Fig. XLIX).

The pointer 23 is supported in coacting relation to the index wheel by the rod 24 mounted on the front extension 21 of the frame (see Fig. II). The magazine is adapted for automatic actuation and also manual actuation or adjustment permitting the operator to select the record to be played. The manually actuated magazine adjusting means is operated from the hand wheel 25 mounted on the shaft 26 extending through the casing (see Figs. I and XXXIV).

On the inner end of the shaft 26 is a sprocket 27 connected by the chain 28 to a sprocket 29 on the shaft 30. The front end of this shaft 30 is supported by the bracket 31 on the frame and its rear end by the swinging arm 32 which is supported at its lower end by the flexible or resilient hinge member 33 (see Figs. XXX, XXXI and XXXVI). A pivot would, in a general way, answer the purpose of this flexible connection 33.

A spacing rod 34 connects the swinging arm 32 with the bracket 31. The shaft 30 is supported for longitudinal as well as rotative movement and is provided with a pinion 35 adapted to be shifted into and out of mesh with the gear 36 on the shaft 37 carried by the bracket 31 and the arm 32 and provided with a magazine engaging wheel 38 adapted to travel on the inner sides of the record holders 9. This magazine engaging wheel 38 has a soft rubber tread 39 (see Figs. XXX and XXXI).

The bearings in the shafts 30 and 37 for the bracket 31 are loose enough to permit the limited swinging movement necessary for the swinging arm or support 32 as the wheel 38 travels over the record holders 9 of the magazine. The pinion 35 is shifted into and out of mesh with the gear 36 by means of the shifting lever 40 pivotally supported at 41 on the bracket 31 and extending at one end into engagement with the hub of the pinion 35. At its other end the clutch lever 40 is provided with a roller 42 adapted to be engaged by the cam 43 on

the control wheel 44 (see Figs. II, XXV, and XXX). The clutch lever is held yieldingly toward the control wheel cam by means of the coiled spring 45 arranged on the shaft 30 and supported at one end by the collar 46, the other end of the spring engaging the slidable collar 47 which engages the lever 40, as shown in detail in Fig. XXXI.

To prevent the accidental shifting of the pinion 35 while the shaft 37 is being driven through the connections described, I provide a stop 48 with which the grooved collar 49 on the shaft 30 engages when the wheel 38 is raised in passing over one of the record holders 9 (see Figs. XXX, XXXI and XXXVI).

A spring 50 is provided for urging the magazine engaging wheel yieldingly against the record holders, one end of the spring being secured to the swinging arm 32 and the other to a bracket 51 (see Fig. XXXVI).

With the parts thus arranged the magazine may be shifted manually when the control wheel is in neutral or unactuated position, as shown in Fig. XXX, in which position the roller 42 is engaged by the cam 43. When the control wheel rotates and the cam passes from the roller 42 the spring 45 acts on the shifting lever to disengage the pinions so that the magazine cannot be actuated manually until the machine has completed its cycle of movement and again come to neutral position. A spring 52 (see Fig. XXX) may be provided to supplement the spring 45 or either of these springs may be made strong enough to perform the required work.

The automatic magazine feed is adapted to feed the magazine step by step bringing the records successively into playing position. To accomplish this the shaft 53 of the control wheel 44 is provided with a crank 54 on its inner end to which the link 55 is connected by the wrist pin 56. The other end of the link is connected to the lower end of the shifting lever 57, which is adapted to engage between the record holders 9 as the crank is revolved moving the magazine forward step by step. The upper end of the lever 57 is provided with a loop 58 embracing the shaft 20 of the magazine wheel 8. The lever 57 is provided with a stop arm 59 projecting over the link 55 to be engaged thereby on the upstroke of the crank 54 so that the lever 57 is lifted from record engaging position and carried backward into engagement with the succeeding record holder, so that on each revolution of the control wheel the magazine is advanced one step. When the control wheel is in its initial position the automatic feed lever is held in disengaging position, as shown in Fig. XL. Details of this automatic feed are

clearly shown in Figs. XXXIX, XL and XLI.

The inner end of the shaft 53 is supported by the arm-like bracket 60 projecting rearwardly from the front frame member or standard 7. The front end of this shaft is supported in a slotted bearing 61 (see Fig. XLIV) permitting a limited lateral movement of the control wheel 44, the purpose of which will be made clear as the description proceeds.

An adjustable stop 62 carried by the bearing limits the outward movement of the shaft, and the adjustable stop 63 through the bracket 60 limits the inward movement of the shaft (see Figs. XXXIX, XLIII and XLIV). The shaft is held yieldingly inward by the spring 64 mounted on the standard 7 and provided with a roller 65 traveling on the shaft (see Figs. XXXIX and XLII). A stop screw 66 is provided for the spring.

The reproducer is supported for vertical adjustment to operative or playing position and the records are picked up and fed longitudinally below the reproducer, the operation of these parts being entirely automatic.

The record feed carriage 68 is provided with a pair of grooved carrying wheels 69 at one side and a pair of plain wheels 70 at the other side. The grooved wheels travel on a track 71 and the plain wheels on a similar track 72. This arrangement of grooved and plain wheels permits free running of the carriage and the carriage is properly guided without binding on the track.

The base plate 6 has an opening 73 between the tracks to accommodate depending portions on the carriage. At its front end the carriage is provided with a bearing bracket 74 having spaced bearings 75 for the shaft 76 of the feed or driving mandrel 77 (see Fig. III). At its inner end the driving mandrel 77 is provided with a conical record engaging portion 78. At the inner end of the carriage is a bearing 79 for the shaft 80 of the disk-like record supporting mandrel 81. The magazine actuating mechanism is arranged to bring the magazine to rest with one of its holders 9 in alignment with these mandrels so that the records 11 may be engaged by the feed mandrel and pushed longitudinally of the holders into engagement with the supporting mandrel, which is also made conical so that the records are picked up and centered thereby and carried across the reproducer. These parts are clearly illustrated in Figs. III and V.

The driving mandrel is of considerable length to provide a driving cylinder or drum with which the driving wheel 82 coacts, this

driving wheel being provided with a rubber or other friction face 83 coacting with the cylinder (see Figs. XVIII and XIX). The driving wheel has a groove 84 for the driving belt 85 of the motor, the motor not being illustrated. The driving wheel is carried by the swinging yoke-like support 86 permitting the shifting of the wheel to secure forward and reverse drives of the carriage, the records being rotated at the same time.

The spindle 87 of the driving wheel is provided with pivot bearings 88 carried by the arms of the support (see Fig. XIX). The support 86 is provided with a spindle 89 supported by the pivot bearings 90 carried by a swinging arm 91 which is in turn mounted on the bracket 92 on the base 6. The arm 91 is supported by the pivot bearings 93. These parts are clearly shown in Figs. XVIII, XIX, XX and XXI. The pivot bearings for the driving wheel support and the swinging arm 91 are preferably threaded for adjustment.

Adjustable stops 94 are provided to limit the swing of the support 86, thus determining the forward and reverse positions of the driving wheel, (see Figs. XVIII, XIX, and XXI).

A coiled spring 95 is secured to the stud 96 on the bracket 92 and to the pin 97 on the arm 91, so that the feed wheel is held yieldingly against the driving or driven mandrel (see Fig. XXVIII).

The driving wheel engages the driving mandrel at an angle carrying it forward when the driving wheel is in forward or feed position and carrying it backward when the driving wheel is in reverse position. The forward driving of the carriage is controlled by the screw feed control screw 98 mounted on the hangers 99 and 100 depending from the carriage.

A feed dog 101 is pivotally mounted at 102 on the cross piece 103 of the base plate 6 to coact with this feed control screw 98 regulating the forward or feed movement of the carriage. The feed dog is held yieldingly in engagement with the screw by the spring 104 so that on the return of the carriage the dog ratchets over the screw. This screw 98 is connected by a train of gears comprising the gear 105 on the screw, the gear 106 on the spindle 80 of the supporting mandrel 81 and the intermediate gears 107 (see Figs. III and VIII). The supporting mandrel 81 is driven from the driving mandrel 78 through the record.

A spring thrust member 108 is provided for the journal 109 of the screw (see Figs. III and VII). A screw 110 is provided for adjusting this thrust spring thereby providing means for taking up any slack or lost motion in the screw. With this arrangement

the feed of the record is positively controlled.

A reproducer bracket 67 is mounted on a post 111 and is provided with a collar 67' for the horn 2. The sound box 112 carrying the stylus 113 is pivotally supported, the details of the pivotal support not being illustrated, and has a vertical movement permitting the stylus being shifted to and from record engaging position. The sound box is provided with a projecting arm 114 adapted to be engaged by the arm 115 on the reproducer control member shifting rod 116. This reproducer control rod 116 is guided at its upper end by the arm 117 extending from the post 118. The lower end of the rod 116 is extended through the base plate 6 and connected to the actuating lever 119 (see Figs. IX, X and XI).

An arm 120 on the reproducer control rod 116 engages the post 121 to prevent the turning of the rod. The lever 119 is pivoted at 122 on the hanger 123 (see Fig. IX) and positioned to be engaged by the pin 124 on the gear 105. When the gear 105, which is one of the screw driving train of gears described, is carried to its forward position the trip pin 124 engages the lever 119 carrying it downwardly and thereby lowering the reproducer to record engaging position. The reproducer control member is held yieldingly in its engaging and disengaging positions by the coiled spring 125 having a pair of arms 126 and 127, the arm 126 being connected to an arm 128 on the lever 119 and the arm 127 to the hanger 123 which is slotted at 129 to receive the end of the lever and its arm 128. As the lever 119 is swung on its pivot either by the pin 124 or through the reproducer raising means, to be described, the arms of the spring are carried past their dead center point and the control member is actuated with a snap action. The action of the spring is illustrated in detail in Figs. XV, XVI and XVII.

A stop 130 is provided for the disengaged position of the lever. A reproducer disengaging bar 131 is supported by a pair of links 132 and 133 which are pivotally mounted on the actuating rod 134 supported for longitudinal movement in the bracket-like bearings 135 (see Figs. X and XI). The disengaging bar is shown in its raised position in Fig. X and in its lowered position in Fig. XI. The link 133 is notched to provide stops 136 coacting with the stop pin 137 to limit the movement of the disengaging bar.

The control member 116 is provided with a pin 138 with which the disengaging bar 131 engages when in its elevated or reproducer disengaging position. The actuating rod 134 has an upwardly extending portion 139 at its front end provided with a laterally

projecting arm 140 having a blade-like extension 141 slotted at 142 to engage a groove 143 in the mandrel shaft 76 (see Figs. III, V, XII, XXI, and XXII). By this arrangement, the actuating rod is shifted or moves with the mandrel shaft 76. When the driving mandrel is fed forwardly the disengaging bar 131 is dropped permitting the reproducer being shifted to engaging position by means of the lever 119, as described, and when the driving mandrel is reversed the disengaging bar is raised, disengaging or raising the reproducer. The disengaging bar initial movement carries the link 133 against the stop 144 mounted on the carriage.

To permit the engaging and disengaging of the reproducer prior to the movement of the carriage the mandrel shaft 76 is mounted for limited longitudinal movement in its bearings, the shaft being provided with a collar 145 which coacts with the inner bearing 75, the head of the mandrel constituting a stop limiting the independent movement of the mandrel in the other direction.

I will now describe the automatic reverse mechanism for the driving wheel.

The spindle 89 of the driving support or carrier is provided with an arm 146. A trip arm 147 is pivotally mounted on the spindle (see Figs. XX, XXI, XXII, XXIII and XXIV). This trip arm is provided with a pair of adjustable stops 148 adapted to coact with the supporting arm 91 limiting the swing of the trip arm.

A coiled spring 149 having arms 150 and 151 is provided, the arm 150 being connected to the arm 146 on the driving wheel support and the arm 151 being connected to the trip arm 147. These arms swing across each other as they shift from one position to the other and the spring yieldingly holds them in both positions and thereby yieldingly supports the driving wheel in its forward or reverse positions. When, however, the trip arm 147 is carried across the dead center the spring acts to shift the driving wheel to its opposite position. The movements are illustrated in Figs. XXI-XXIV, inclusive.

The trip arm 147 is provided with a spring extension 152 with which the tappets 153 and 154 coact to actuate the trip arm. These tappets are mounted on a rod 155 carried by the upright portion 139 of the actuating rod 134. With the parts thus arranged, the driving wheel is automatically reversed at the ends of the movement of the carriage and the reproducer is automatically lowered to and raised from its operative position.

The records are, as stated, picked up from the record holders by the driving mandrel and carried or pushed into engagement with the supporting mandrel, the record engaging portions of the mandrels being made

conical so that the records are properly centered.

To insure the returning of the records to the holders in such position that they do not engage the end of the magazine guard 12 I provide a record return slide 156 which is slidably mounted on the carriage (see Fig. V), the slide being slotted at 157 and retained by the screw 158 engaging the slot. A rod 159 extends forwardly from the slide and has an upturned end 160 which is engaged by the arm 140 on the upright 139. A spring 159' is provided for returning the slide to its initial position.

The lost motion connection between the driving mandrel and the carriage provides for disengaging the driving wheel of the control wheel, picking up the records and records of different lengths, for operating the record disengaging slide to disengage the records from the supporting mandrel and for operating the reproducer disengaging bar. In operating the driving mandrel is carried rapidly inward by the driving wheel until it engages the record or the stop collar 145 engages the inner mandrel shaft bearing, and until one or the other engagement occurs the carriage remains in its initial position. When the feed mandrel engages a record and forces it upon the supporting mandrel the carriage is pushed forwardly, its speed being controlled by the feed regulating screw. (On the reversing of the driving wheel the feed dog ratchets over the feed screw permitting the rapid return of the carriage.

A record support 161 of substantially the diameter of the record holders 9 of the magazine and alined therewith when the holders are in playing position is arranged to receive the records as they drop from the mandrels when released therefrom. This support has a slot in its bottom to accommodate the bearing bracket for the supporting mandrel shaft and the train of gears for driving the feed screw (see Fig. III). At the completion of the feed stroke when the record is released by the mandrels it drops into this support which is lined with suitable fabric or other soft material and is slid along therein by the return slide into the magazine holder.

The control wheel 44 times or synchronizes the operation of the magazine and the playing cycle of the machine.

The control of the manual operating means for the magazine by means of the shifting lever 40 and the cam 43 of the control wheel has been described.

The control wheel is driven from the mandrel shaft 76 which is provided with a friction wheel 162 mounted to be brought into and out of engagement with the control wheel as the carriage reciprocates, it being brought into engagement therewith

when the carriage is in initial position and carried out of engagement at the beginning of the feed stroke.

The control wheel is provided with a friction band or face 163 with which its driving wheel 162 coacts. A recess or notch 164 is formed in the friction face 163 of the control wheel and the driving wheel 162 passes into this recess when the control wheel is brought to playing position.

The shaft 53 of the control wheel 44 is supported for limited lateral movement in its bearing 61, as has been described.

To retain its driving wheel 162 in engagement with the control wheel during the time required to bring the magazine actuating parts to position, and to time the starting of the feed movement the driving wheel support 86 is provided with an arm 165 adapted to coact with the flange 166 on the control wheel or to be engaged behind the flange, thus preventing the shifting of the feed wheel carrier to driving position, the feed wheel being held in neutral position until the control wheel is brought to the position shown in Fig. XXV, when the arm 165 swings through the notch or opening 167 in the flange 166. The engaged position of the arm 165 is illustrated in Fig. XXVII. When the carriage reaches the end of its playing stroke or travel the feed wheel is reversed by the mechanism described, and this reversal swings the arm 165 through the notch, so that when the control wheel is rotated the arm is carried behind the flange 166 and the driving wheel held in neutral or its initial position. The control wheel is retained in its playing position by the stop 168 on the base plate 6 with which the spring stop 169 on the control wheel coacts until the return of the carriage when the stop 169 is disengaged by the trip 170 on the carriage (see Fig. XXV). This return movement brings its driving wheel 162 into engagement with the control wheel and revolves the control wheel to neutral position at which position it is stopped by the discharge of the coin, which breaks the circuit and stops the motor. The control wheel is illustrated in its neutral position in Fig. II.

When a coin is introduced the motor is started and the control wheel is revolved until it reaches its playing position, shown in Fig. XXV, which allows the arm 165 to swing through the notch 167 in the flange 166 permitting the driving wheel to shift to feeding position. This feeds the carriage forward, as described, disengaging the driving wheel 162 from the control wheel and carrying the trip 170 from the position shown in Fig. XXV, allowing the spring stop 169 to move against the stop 168. On the return of the carriage the stop 169 is engaged by the trip 170 and carried from its

coacting stop 168, the driving wheel 162 being brought into engagement with the control wheel driving the same until the coin is discharged, as above stated.

I will now briefly describe the coin control mechanism:

The coin chute 171 is provided with a face plate 172 and casing for the introduction of coins. This coin chute is preferably provided with a glass panel 173 so that the operator can see the coin as it drops through the chute into actuating position. In Fig. LV I illustrate a coin 174 in actuating or contact making position. The contact is made through a pair of contact members 175 and 176, the contact member 175 having coin engaging or contact points 177 and 178, the contact member 176 having coin engaging contact points 179 and 180. The contact member 176 is pivoted at 181 and provided with a stop 182 which projects into a hole 183 in the contact member, the hole being of such diameter as to determine the movement of the contact member. The pivot 181 constitutes a binding post for the wire 184 while the contact member 175 is provided with a binding post 185 for the wire 186. The coin 174 drops into engagement with the points 177 and 179 of the contact members completing the circuit. A second set of coin engaging members is provided so that when the contact member 176 is oscillated to drop the coin from its first position, shown in full lines, the coin is engaged with the second set of engaging members 178 and 180 so that should there be more than one coin in the chute it is supported by the first coin until the contact member 176 is actuated to finally drop the coin and returned to its initial position, in which position the contact point 179 is in position to engage the second coin, thus preventing more than one coin being discharged at a time.

When the movable contact 176 is in its second position it engages the binding post 181' of the short circuit wire 181" which is connected to the binding post 185.

The contact member 176 is actuated from the control wheel. To accomplish this, I provide a rock shaft 187 having an arm 188 thereon connected by the spring 189 to the contact member 176, the spring being provided with a pair of arms 190 and 191, one arm being connected to the insulating block 192 on the arm 188 and the other to the contact member. This spring and its arms are so disposed that they swing past a dead center as the arm 188 is swung thereby serving to hold the contact member 176 yielding in either position and actuating it with a snap-like action, the spring being of the same type as is employed on the driving wheel reverse and on the reproducer actuating mechanism described.

A stop 193 is provided for the arm 188. The rock shaft 187 is actuated from the control wheel, the rock shaft being provided with an arm 194 connected to the wrist pin 195 on the control wheel by the link 196, so that the coin contacts are controlled by the movement of the control wheel and the discharge of the coin stops the motor, which, in turn, controls or stops the control wheel and the making of contacts starting the motor drives the control wheel.

The coin drops from the coin chute into the coin delivery chute 197 which directs the coins into a coin receptacle 198 having a plurality of coin pockets 199. This coin holder is in the form of a wheel with the coin pockets or receptacles in the form of tubes mounted on the rim 200 of the wheel. These pockets correspond in number to the number of the record holders and the coin receptacle is driven with the record holder so that the coins received for playing each record are delivered into a receptacle corresponding to that record. To accomplish this the shaft 201 of the coin receptacle is provided with a beveled gear 202 at its upper end meshing with a beveled gear 203 on a shaft 204 which is in turn connected by the gears 205 and 206 to the magazine shaft 20 so that the coin receptacle is driven or rotated with the magazine bringing its several coin pockets into proper position to receive the coin from the discharge chute. The coin receptacles revolve above the bottom plate 207 which is provided with a discharge slide 208 having an opening 209 therein, the slide being pulled out until the opening registers with the receptacles and the coins are discharged therethrough. With the slide in its discharging position the coin receptacle is rotated to bring its several pockets into discharging position above the slide.

For convenience, the shaft 201 is formed in sections as shown in Fig. LIII, the sections being joined by a coupling 210 which consists of a coupling head 211 secured to the shaft section by the set screw 212 and slotted at 213 to receive the arm 214 on the other sections. The sleeve 215 holds the arm in the slot. The sleeve 215 is yieldingly held in operative position by the spring 216.

I will now briefly describe the complete cycle of operation of my improvements as I have embodied them in the structure illustrated.

With the parts in neutral position as shown in Fig. II the magazine may be freely turned by means of the hand wheel 25 (see Fig. XXXIV) to move the desired record into playing position, or if the magazine is not adjusted manually the record which happens to be in playing position will be played upon the introduction of a coin. Upon the introduction of a coin the circuit is completed and the motor started which

drives the driving mandrel and, through the connections described, rotates the control wheel from its neutral position to its playing position, shown in Fig. XXV. In this position the shifting lever 40 has passed from 70 the cam 43 disengaging the pinion 35 thereby preventing further manual adjustment of the magazine. In this position the control arm 165 of the driving wheel has passed through the notch 167 of the flange 166 which allows the feed mandrel to swing to its forward or feed position and the feed mandrel is rapidly driven into engagement with the record, which is forced into engagement with the supporting mandrel and drives the feed screw through its connections with the supporting mandrel described. Upon the starting of the supporting mandrel the lever 119 is actuated by the pin 124 on the gear 105 to lower the reproducer to operative position, so that the stylus coacts with the record as it is fed along below the same. Upon the completion of the playing stroke the driving wheel is reversed by the tappet 153 acting on the driving wheel reversing mechanism described.

The reversing of this driving wheel first shifts the feed mandrel to the extent of its lost motion connection with the carriage which movement disengages the record from the mandrel, the mandrel release slide 156 pulling the record from the supporting mandrel, and actuates the reproducer disengaging bar 131. The carriage is then returned to its initial position. On the return of the carriage to its initial position the stop trip 170 releases the spring stop 179 of the control wheel and the driving wheel 162 is brought into driving engagement with the control wheel and drives the same to neutral position at which position the coin is discharged. During this driving or return of the control wheel to neutral position the automatic magazine feed is actuated to advance the magazine one step and the coin discharge mechanism is actuated through the mechanisms described.

As the control arm 165 of the driving wheel is engaged behind the flange 166 of the control wheel support the parts are all retained in neutral position until the motor is started by the introduction of a second coin, or if a second coin has been introduced before the first is discharged the movement is practically continuous. During the return of the control wheel to its neutral position the magazine is advanced one step.

It will be observed that my improved phonograph is entirely automatic with the exception of the means which permits the manual adjustment of the magazine.

I have illustrated and described my improvements in the form in which I have embodied the same. I have not attempted to illustrate or describe various modifications

in structural details which might be desirable under certain conditions as I believe the disclosure made will enable those skilled in the art to which my invention relates to embody or adapt the same as may be desired. I desire, however, to be understood as claiming my improvements specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a structure of the class described, the combination of a record magazine comprising a shaft and a wheel provided with record holders, an index wheel on said magazine shaft provided with indicia corresponding to said record holders, a coating fixed index member, a control wheel provided with a cam, a control wheel shaft provided with a crank, a magazine actuating lever provided with a loop engaging said magazine shaft, a link connecting said crank to said lever, a rest arranged on said lever to engage said link as the crank revolves so that said lever is successively engaged with the record holders as the control wheel is rotated advancing the magazine step by step, means for driving said control wheel, means for manually adjusting said magazine comprising a shaft provided with a friction wheel traveling on said record holders, a driving shaft, meshing gears on said driving and friction wheel shafts, one of said gears being adjustable to permit its being shifted into and out of mesh with the other, a shifting lever for such adjustable gear coacting with said cam on said control wheel whereby said gears are engaged when the control wheel is in its initial position, and disengaged when it moves from such position, a support for the outer ends of said friction wheel and driving shafts, a swinging support for their inner ends, and a spring acting on said swinging support to hold said friction wheel yieldingly against said record holders.

2. In a structure of the class described, the combination of a record magazine comprising a shaft and a wheel provided with record holders, a control wheel provided with a cam, a control wheel shaft provided with a crank, a magazine actuating lever provided with a loop engaging said magazine shaft, a link connecting said crank to said lever, a rest arranged on said lever to engage said link as the crank revolves so that said lever is successively engaged with the record holders as the control wheel is rotated advancing the magazine step by step, means for driving said control wheel, means for manually adjusting said magazine comprising a shaft provided with a friction wheel traveling on said record holders, a driving shaft, meshing gears on said driving

and friction wheel shafts, one of said gears being adjustable to permit its being shifted into and out of mesh with the other, a shifting lever for such adjustable gear coacting with said cam on said control wheel whereby said gears are engaged when the control wheel is in its initial position, and disengaged when it moves from such position, a support for the outer ends of said friction wheel and driving shafts, a swinging support for their ends, and a spring acting on said swinging support to hold said friction wheel yieldingly against said record holders.

3. In a structure of the class described, the combination of a record magazine comprising a shaft and a wheel provided with record holders, a driving shaft provided with a crank, a magazine actuating lever provided with a loop engaging said magazine shaft, a link connecting said crank to said lever, a rest arranged on said lever to engage said link as the crank revolves so that said lever is successively engaged with the record holders as the control wheel is rotated advancing the magazine step by step.

4. In a structure of the class described, the combination of a record magazine wheel provided with record holders, an index wheel for said magazine provided with indicia corresponding to said record holders, a coating fixed index member, means for automatically driving said magazine with a step by step movement comprising a control wheel provided with a cam, means for driving said control wheel, means for manually adjusting said magazine comprising a shaft provided with a friction wheel traveling on said record holders, a driving shaft, meshing gears on said driving and friction wheel shafts, one of said gears being adjustable to permit its being shifted into and out of mesh with the other, a shifting lever for such adjustable gear coacting with said cam on said control wheel whereby said gears are engaged when the control wheel is in its initial position, and disengaged when it moves from such position.

5. In a structure of the class described, the combination of a record magazine wheel provided with record holders, means for automatically driving said magazine with a step by step movement comprising a control wheel provided with a cam, means for driving said control wheel, means for manually adjusting said magazine comprising a shaft provided with a friction wheel traveling on said record holders, a driving shaft, meshing gears on said driving and friction wheel shafts, one of said gears being adjustable to permit its being shifted into and out of mesh with the other, a shifting lever for such adjustable gear coacting with said cam on said control wheel where-

by said gears are engaged when the control wheel is in its initial position, and disengaged when it moves from such position.

6. In a structure of the class described, 5 the combination of a record magazine wheel provided with record holders, means for automatically driving said magazine with a step by step movement comprising a control wheel provided with a cam, means for driving 10 said control wheel, means for manually adjusting said magazine comprising a shaft provided with a friction wheel traveling on said record holders, a driving shaft, meshing gears on said driving and friction 15 wheel shafts, one of said gears being adjustable to permit its being shifted into and out of mesh with the other, a shifting lever for such adjustable gear coacting with said cam on said control wheel whereby said 20 gears are engaged when the control wheel is in its initial position, and disengaged when it moves from such position, a support for the outer ends of said friction wheel and driving shafts, a swinging support for 25 their inner ends, and a spring acting on said swinging support to hold said friction wheel yieldingly against said record holders.

7. In a structure of the class described, 30 the combination of a record magazine wheel provided with record holders, a magazine actuating lever slidably supported at one end, an actuating crank, a link connecting said crank to said lever, and a rest 35 arranged on said lever to engage said link as the crank revolves so that said lever is successively engaged with the record holders as the control wheel is rotated advancing the magazine step by step.

8. In a structure of the class described, 40 the combination of a record magazine, a lever slidably supported at one end to engage said magazine, an actuating crank, a link connecting said crank to said lever, and 45 a rest arranged on said lever to engage said link as the crank revolves so that said lever is engaged with the magazine advancing it step by step.

9. In a structure of the class described, 50 the combination of a record magazine wheel provided with record holders, means for automatically driving said magazine with a step by step movement, means for adjusting 55 said magazine comprising a friction wheel traveling on said record holders, and manually operable driving connections for said friction wheel, and means for engaging said driving connections automatically controlled by said automatic driving means.

10. In a structure of the class described, 60 the combination with a revoluble record magazine, an index for said magazine, means for actuating said magazine with a step by step movement, said means being 65 disengaged from said magazine when in its

initial position, means for manually adjusting said magazine comprising a friction wheel coacting with said magazine, a driving shaft having driving connections with said friction wheel, and means for automatically engaging said driving connections 70 when said actuating means is in initial position and for disengaging said driving connections when said actuating means moves from its initial position. 75

11. In a structure of the class described, the combination with a revoluble record magazine, means for actuating said magazine with a step by step movement, said means being disengaged from said magazine 80 when in its initial position, means for manually adjusting said magazine comprising a friction wheel coacting with said magazine, a driving shaft having driving connections with said friction wheel, and 85 means for automatically engaging said driving connections when said actuating means is in initial position and for disengaging said driving connections when said actuating means moves from its initial position. 90

12. In a structure of the class described, the combination with a revoluble record magazine, means for actuating said magazine with a step by step movement, said means being disengaged from said magazine 95 when in its initial position, means for manually adjusting said magazine and holding it in its adjusted position comprising driving connections, and means for automatically engaging said driving connections when 100 said actuating means is in initial position and for disengaging said driving connections when said actuating means moves from its initial position.

13. In a structure of the class described, 105 the combination of a record magazine comprising a wheel having a plurality of open ended record holders disposed peripherally thereon, annular guards supported at the ends of said record holders, one of said 110 guards having an offset therein providing an opening through which the records may be inserted or removed from said holders, a closure extending across said opening and pivotally mounted on one end of said offset, 115 a spring arranged to hold said closure member normally in its closed position in alignment with the guards, a reproducer disposed at one side of said magazine, said guards having openings therein in alignment with 120 said reproducer, a carriage provided with record supporting and driving mandrels, and means for actuating said carriage and mandrels whereby the records are picked up from the holders and carried to the reproducer. 125

14. In a structure of the class described, the combination of a record magazine comprising a wheel having a plurality of open ended record holders disposed peripherally 130

thereon, annular guards supported at the ends of said record holders, a reproducer disposed at one side of said magazine, said guards having openings therein in alinement with said reproducer, a carriage provided with spaced record supporting and driving mandrels, arranged to receive a record holder between them, and means for actuating said carriage and mandrels whereby the records are picked up from the holders and carried past the reproducer and out of said holders.

15. In a structure of the class described, the combination of a record magazine comprising a wheel having a plurality of open ended record holders disposed peripherally thereon, annular guards supported at the ends of said record holders, one of said guards having an offset therein providing an opening through which the records may be inserted or removed from said holders, a closure extending across said opening and pivotally mounted on one end of said offset, and a spring arranged to hold said closure member normally in its closed position in alinement with the guards.

16. In a structure of the class described, the combination of a record magazine comprising a wheel having a plurality of open ended record holders disposed peripherally thereon, a reproducer disposed at one side of said magazine, and a carriage provided with spaced record mandrels between which said record holders are carried as the magazine is adjusted, and means for actuating said carriage and mandrels whereby the records are picked up from the holders and carried past the reproducer.

17. In a structure of the class described, the combination of a record magazine having a plurality of open ended record holders, a reproducer disposed at one side of said magazine, a carriage provided with spaced record mandrels, means for adjusting said magazine to bring said record holders between said mandrels, and means for actuating said carriage and said mandrels whereby the records are picked up from the holders and carried to the reproducer.

18. In a structure of the class described, the combination of an open ended record holder supported for lateral adjustment, a reproducer disposed at one end of said holder, a carriage provided with spaced record mandrels, means for adjusting said holder to bring it between said mandrels, and means for actuating said carriage and said mandrels whereby the record carried by said holder is picked up from the holder and carried to the reproducer.

19. In a structure of the class described, the combination of a record magazine provided with open ended cylindrical record holders, a reproducer disposed at one side of said magazine, a carriage, a driving mandrel

and a coacting supporting mandrel arranged to receive the record holders between them when the carriage is in its initial position, said driving mandrel being supported for limited axial lost motion movement relative to the carriage and so that it may enter the record holder alined therewith, driving means for said magazine whereby its holders are brought between and into alinement with said mandrels, means for driving said driving mandrel rotatably and axially to advance and return the carriage, a feed control means for said carriage, driving connections for said feed control means to said supporting mandrel, means for lowering said reproducer controlled by such driving connections, means for raising the reproducer actuated during the reverse lost motion movement of the driving mandrel, a record return slide actuated during such reverse lost motion movement of the driving mandrel to disengage the record from the supporting mandrel and return it to the holder on the return movement of the carriage, and a record support with which said record holders are alined when in playing position adapted to support a record when it is released from said mandrels and guide it to the magazine holder.

20. In a structure of the class described, the combination of a record magazine provided with open ended cylindrical record holders, a reproducer disposed at one side of said magazine, a carriage, a driving mandrel and a coacting supporting mandrel arranged to receive the record holders between them when the carriage is in its initial position, said driving mandrel being supported for limited axial lost motion movement relative to the carriage and so that it may enter the record holder alined therewith, driving means for said magazine whereby its holders are brought between and into alinement with said mandrels, means for driving said driving mandrel rotatably and axially to advance and return the carriage, a record return slide actuated during such reverse lost motion movement of the driving mandrel to disengage the record from the supporting mandrel and return it to the holder on the return movement of the carriage, and a record support with which said record holders are alined when in playing position adapted to support a record when it is released from said mandrels and guide it to the magazine holder.

21. In a structure of the class described, the combination of a record magazine provided with open ended cylindrical record holders, a reproducer disposed at one side of said magazine, a carriage, a driving mandrel and a coacting supporting mandrel arranged to receive the record holders between them when the carriage is in its initial posi-

tion, driving means for said magazine whereby its holders are brought between and into alinement with said mandrels, means for driving said driving mandrel rotatably and axially to advance and return the carriage, a feed control means for said carriage, driving connections for said feed control means to said supporting mandrel, means for lowering said reproducer controlled by such driving connections, means for raising the reproducer actuated during the reverse lost motion movement of the driving mandrel, and means for returning the records to the holders on the return movement of the carriage.

22. In a structure of the class described, the combination of a record magazine provided with open ended cylindrical record holders, a reproducer disposed at one side of said magazine, a carriage, a driving mandrel and a coating supporting mandrel arranged to receive the record holders between them when the carriage is in its initial position, driving means for said magazine whereby its holders are brought between and into alinement with said mandrels, means for driving said driving mandrel rotatably, and axially to advance and return the carriage, and means for returning the records to the holders on the return movement of the carriage.

23. In a structure of the class described, the combination of a record holder, a reproducer disposed at one end of said holder, a carriage, a driving mandrel and a coating supporting mandrel, said driving mandrel being supported for limited axial lost motion movement relative to the carriage, a friction driving wheel coaxing with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control screw for said carriage, a feed dog coaxing therewith, driving connections for said screw to said supporting mandrel, means for lowering said reproducer controlled by such driving connections, means for automatically reversing said driving wheel at the end of the forward movement of the carriage, means for raising the reproducer actuated during the reverse lost motion movement of the driving mandrel, a record return slide actuated during such reverse lost motion movement of the driving mandrel to disengage the record from the supporting mandrel and return it to the holder during the return movement of the carriage, and a record support with which said record holder is alined when in playing position adapted to support a record when it is released from said mandrels and guide it into the magazine holder.

24. In a structure of the class described, the combination of a record holder, a repro-

ducer disposed at one end of said holder, a carriage, a driving mandrel and a coating supporting mandrel, said driving mandrel being supported for limited axial lost motion movement relative to the carriage, a friction driving wheel coaxing with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control means for said carriage, means for automatically reversing said driving wheel at the end of the forward movement of the carriage, means for raising the reproducer actuated during the reverse lost motion movement of the driving mandrel, a record return slide actuated during such reverse lost motion movement of the driving mandrel to disengage the record from the supporting mandrel and return it to the holder during the return movement of the carriage, and a record support with which said record holder is alined when in playing position adapted to support a record when it is released from said mandrels and guide it into the magazine holder.

25. In a structure of the class described, the combination of a record holder, a reproducer disposed at one end of said holder, a carriage, a driving mandrel and a coating supporting mandrel, said driving mandrel being supported for limited axial lost motion movement relative to the carriage, a friction driving wheel coaxing with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control screw for said carriage, a feed dog coaxing therewith, driving connections for said screw to said supporting mandrel, means for lowering said reproducer controlled by such driving connections, means for automatically reversing said driving wheel at the end of the forward movement of the carriage, a record return slide actuated during such reverse lost motion movement of the driving mandrel to disengage the record from the supporting mandrel and return it to the holder during the return movement of the carriage, and a record support with which said record holder is alined when in playing position adapted to support a record when it is released from said mandrels and guide it into the magazine holder.

26. In a structure of the class described, the combination of a record holder, a reproducer disposed at one end of said holder, a carriage, a driving mandrel and a coating supporting mandrel, said driving mandrel being supported for limited axial lost motion movement relative to the carriage, a friction driving wheel coaxing with said driving mandrel, said driving wheel being supported so that it may be adjusted to

change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control means for said carriage, means for automatically reversing said driving wheel at the end of the forward movement of the carriage, a record return slide actuated during such reverse lost motion movement of the driving mandrel to disengage the record from the supporting mandrel and return it to the holder during the return movement of the carriage, and a record support with which said record holder is alined when in playing position adapted to support a record when it is released from said mandrels and guide it into the magazine holder.

27. In a structure of the class described, the combination of a record holder, a sound box disposed at one end of said holder, a carriage, a driving mandrel supported for limited axial movement relative to the carriage, a friction driving wheel coacting with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, a feed control means for said carriage, means for automatically lowering said sound box on the initial movement of the carriage actuated by said feed control means, means for automatically reversing said driving wheel at the end of the forward movement of the carriage, and means for raising the sound box actuated during the reverse lost motion movement of the driving mandrel.

28. In a structure of the class described, the combination of a record holder, a sound box disposed at one end of said holder, a carriage, a driving mandrel, a friction driving wheel coacting with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, and means for automatically reversing said driving wheel at the end of the forward movement of the carriage.

29. In a structure of the class described, the combination of a record magazine provided with open ended cylindrical record holders, a sound box, a carriage, a driving mandrel and a coacting supporting mandrel arranged to receive the record holders between them when the carriage is in its initial position, said driving mandrel being supported for limited axial lost motion movement relative to the carriage and so that it may enter the record holder alined therewith, and means for driving said driving mandrel rotatably and axially to advance and return the carriage.

30. In a structure of the class described, the combination of a record magazine provided with open ended cylindrical record holders, a sound box, a carriage, a driving

mandrel and a coacting supporting mandrel arranged to receive the record holders between them when the carriage is in its initial position, and means for driving said driving mandrel rotatably and axially to advance and return the carriage.

31. In a structure of the class described, the combination of a sound box, a carriage, a driving mandrel and a coacting supporting mandrel, said driving mandrel being supported for limited axial lost motion movement relative to the carriage, a friction driving wheel coacting with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control screw for said carriage, a feed dog coacting therewith, and driving connections for said screw to said supporting mandrel.

32. In a structure of the class described, the combination of a sound box, a carriage, a driving mandrel and a coacting supporting mandrel, supported for limited axial lost motion movement relative to the carriage, a friction driving wheel coacting with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control means for said carriage.

33. In a structure of the class described, the combination of a sound box, a carriage, a driving mandrel, a friction driving wheel coacting with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage, a feed control screw for said carriage, a feed dog coacting therewith, and driving connections for said screw to said supporting mandrel.

34. In a structure of the class described, the combination of a sound box, a carriage, a driving mandrel, a friction driving wheel coacting with said driving mandrel, said driving wheel being supported so that it may be adjusted to change its angle relative to the driving mandrel to drive the mandrel and advance and return the carriage.

35. In a structure of the class described, the combination of a magazine, a control wheel provided with an annular flange having an opening therein, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to

disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel and a coating supporting mandrel, said driving mandrel being supported
 5 for limited axial lost motion movement relative to the carriage and being provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coaxing with
 10 said driving mandrel, a pivoted support for said driving wheel disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change
 15 its driving angle to advance and return the carriage, a spring arranged to hold said driving wheel support yieldingly in its adjusted positions, means for reversing said driving wheel controlled by the movement
 20 of the carriage, an arm on said driving wheel support adapted to swing through said opening in said control wheel flange whereby said driving wheel is retained in its initial position during a rotation of said
 25 control wheel, a feed control means for said carriage including said supporting mandrel, means for lowering said sound box actuated by said feed control means, means for raising the sound box during the
 30 reverse lost motion movement of said driving mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

36. In a structure of the class described, the combination of a magazine, a control
 35 wheel provided with an annular flange having an opening therein, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel,
 40 a sound box, a carriage, a driving mandrel and a coating supporting mandrel, said driving mandrel being supported for limited axial lost motion movement relative to the carriage and being provided with a control
 45 wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coaxing with said driving mandrel, a pivoted support for said driving wheel disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving
 50 angle to advance and return the carriage, a spring arranged to hold said driving wheel support yieldingly in its adjusted positions, means for reversing said driving wheel controlled by the movement of the carriage, an arm on said driving wheel support adapted to swing through said
 55 opening in said control wheel flange whereby said driving wheel is retained in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting
 60 mandrel, means for lowering said sound

box actuated by said feed control means, means for raising the sound box during the reverse lost motion movement of said driving mandrel, a stop for said control wheel, and a trip therefor carried by said carriage. 70

37. In a structure of the class described, the combination of a magazine, a control wheel provided with an annular flange having an opening therein, operating connections for said magazine and control wheel
 75 whereby the magazine is advanced one step upon each revolution of the control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage,
 85 a driving mandrel provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coaxing with said driving
 90 mandrel, a pivoted support for said driving wheel disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle to advance and return the carriage,
 95 a spring arranged to hold said driving wheel support yieldingly in its adjusted positions, means for reversing said driving wheel controlled by the movement of the carriage, an arm on said driving wheel support adapted to swing through said opening in said control wheel flange whereby said driving wheel is retained in its initial position during the rotation of said control wheel, a feed control means for said carriage, a stop for said control wheel, and a trip therefor carried by said carriage. 100

38. In a structure of the class described, the combination of a magazine, a control wheel provided with an annular flange having an opening therein, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel, a sound box, a carriage, a driving mandrel
 110 provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coaxing with said driving mandrel, a pivoted support for said driving wheel disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle to advance and return the carriage, a spring arranged to hold said driving wheel support yieldingly in its adjusted positions, means for reversing said driving wheel controlled by the movement of the carriage, an arm on said driving wheel support adapted to swing
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 125
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through said opening in said control wheel flange whereby said driving wheel is retained in its initial position during the rotation of said control wheel, a feed control means for said carriage, a stop for said control wheel, and a trip therefor carried by said carriage.

39. In a structure of the class described, the combination of a control wheel provided with an annular flange having an opening therein, a sound box, a carriage, a driving mandrel and a coacting supporting mandrel, said driving mandrel being supported for limiting axial lost motion movement relative to the carriage and being provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position. a friction driving wheel coacting with said driving mandrel, a pivoted support for said driving wheel disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle to advance and return the carriage, a spring arranged to hold said driving wheel support yieldingly in its adjusted positions, means for reversing said driving wheel controlled by the movement of the carriage, an arm on said driving wheel support adapted to swing through said opening in said control wheel flange whereby said driving wheel is retained in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting mandrel, means for lowering said sound box actuated by said feed control means, means for raising the sound box during the reverse lost motion movement of said driving mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

40. In a structure of the class described, the combination of a control wheel provided with an annular flange having an opening therein, a sound box, a carriage, a driving mandrel provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction wheel coacting with said driving mandrel, a pivoted support for said driving wheel disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle to advance and return the carriage, a spring arranged to hold said driving wheel support yieldingly in its adjusted positions, means for reversing said driving wheel controlled by the movement of the carriage, an arm on said driving wheel support adapted to swing through said opening in said control wheel flange whereby said driving wheel is retained in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting mandrel,

means for lowering said sound box actuated by said feed control means, means for raising the sound box during the reverse lost motion movement of said driving mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

41. In a structure of the class described, the combination of a magazine, a control wheel, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel and a coacting supporting mandrel, said driving mandrel being provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting mandrel, means for lowering said sound box actuated by said feed control means, means for raising the sound box actuated by said feed control means, means for raising the sound box through said mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

42. In a structure of the class described, the combination of a control wheel, a sound box, a carriage, a driving mandrel and a coacting supporting mandrel, said driving mandrel being provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting mandrel, means for lowering said sound box actuated by said feed control means, means for raising the sound box through said mandrel, a stop for

said control wheel, and a trip therefor carried by said carriage.

43. In a structure of the class described, the combination of a magazine, a control wheel, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel and a co-acting supporting mandrel, said driving mandrel being provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting mandrel, means for lowering said sound box actuated by said feed control means, means for raising the sound box through said mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

44. In a structure of the class described, the combination of a magazine, a control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel and a coacting supporting mandrel, said driving mandrel being provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a feed control means for said carriage including said supporting mandrel, means for lowering said sound box

actuated by said feed control means, means for raising the sound box through said mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

45. In a structure of the class described, the combination of a magazine, a control wheel, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a stop for said control wheel, and a trip therefor carried by said carriage.

46. In a structure of the class described, the combination of a control wheel, a sound box, a carriage, a driving mandrel provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a stop for said control wheel, and a trip therefor carried by said carriage.

47. In a structure of the class described, the combination of a magazine, a control wheel, operating connections for said magazine and control wheel whereby the magazine is advanced one step upon each revolution of the control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel provided

with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a stop for said control wheel, and a trip therefor carried by said carriage.

48. In a structure of the class described, the combination of a magazine, a control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is in its initial position and to disengage the same when said control wheel is actuated, a sound box, a carriage, a driving mandrel provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a stop for said control wheel, and a trip therefor carried by said carriage.

49. In a structure of the class described the combination of a magazine, a control wheel, manually operated driving connections for said magazine, means for connecting and disconnecting said driving connections automatically operated by said control wheel to engage said driving connections when the control wheel is actuated and to disengage the same when said control wheel is returned to its initial position, a sound box, a carriage, a driving mandrel provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said driving mandrel, and supported so that it may be adjusted to change its angle relative to the driving mandrel to advance and return the carriage, means for reversing said driving wheel controlled by the movement of the carriage, said control wheel being provided with means for retaining said driving wheel in its initial position during the rotation of said control wheel, a stop for said control wheel, and a trip therefor carried by said carriage.

50. In a structure of the class described, the combination of a magazine, a control wheel, operating means for said magazine timed with said control wheel, a sound box, a carriage, a driving mandrel mounted on said carriage and provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said mandrel to rotate the same and to advance and return the carriage, means for controlling said driving wheel controlled by the movement of the carriage and said control wheel, means for controlling said sound box including said mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

51. In a structure of the class described, the combination of a control wheel, a sound box, a carriage, a driving mandrel mounted on said carriage and provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said mandrel to rotate the same and to advance and return the carriage, means for controlling said driving wheel controlled by the movement of the carriage and said control wheel, means for controlling said sound box including said mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

52. In a structure of the class described, the combination of a magazine, a control wheel, operating means for said magazine timed with said control wheel, a sound box, a carriage, a driving mandrel mounted on said carriage and provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said mandrel to rotate the same and to advance and return the carriage, means for controlling said driving wheel controlled by the movement of the carriage and said control wheel, means for controlling said sound box including said mandrel, a stop for said control wheel, and a trip therefor carried by said carriage.

timed with said control wheel, a soundbox, a carriage, a driving mandrel mounted on said carriage and provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said mandrel to rotate the same and to advance and return the carriage, means for controlling said driving wheel controlled by the movement of the carriage and said control wheel, and means for controlling said sound box including said mandrel.

55. In a structure of the class described, the combination of a control wheel, a sound box, a carriage, a driving mandrel mounted on said carriage and provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said mandrel to rotate the same and to advance and return the carriage, means for controlling said driving wheel controlled by the movement of the carriage and said control wheel, means for controlling said sound box including said mandrel.

56. In a structure of the class described, the combination of a magazine, a control wheel, operating means for said magazine timed with said control wheel, a sound box, a carriage, a driving mandrel mounted on said carriage and provided with a control wheel driving member which is brought into driving engagement therewith when the carriage is in its initial position, a friction driving wheel coacting with said mandrel to rotate the same and to advance and return the carriage, means for controlling said driving wheel controlled by the movement of the carriage and said control wheel, means for controlling said sound box including said mandrel.

trolled by the movement of the carriage and said control member, means for controlling said sound box including said mandrel, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

59. In a structure of the class described, the combination of a magazine, a control member, operating means for said magazine timed by said control member, a carriage, a driving mandrel mounted on said carriage and provided with driving means for said control member which is in driving relation thereto when the carriage is in its initial position, means for driving said mandrel and carriage, means for controlling said mandrel driving means controlled by the movement of the carriage and said control member, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

60. In a structure of the class described, the combination of a control member, a sound box, a carriage, a driving mandrel mounted on said carriage and provided with driving means for said control member which is in driving relation thereto when the carriage is in its initial position, means for driving said mandrel and carriage, means for controlling said mandrel driving means controlled by the movement of the carriage and said control member, means for controlling said sound box including said mandrel, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

61. In a structure of the class described, the combination of a control member, a carriage, a driving mandrel mounted on said carriage and provided with driving means for said control member which is in driving relation thereto when the carriage is in its initial position, means for driving said mandrel and carriage, means for controlling said driving means controlled by the movement of the carriage and said control member, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

62. In a structure of the class described, the combination of a magazine, a control member, operating means for said magazine timed by said control member, a carriage, a driving mandrel mounted on said carriage and provided with driving means for said control member which is in driving relation thereto when the carriage is in its initial position, means for driving said mandrel and carriage, means for controlling said mandrel driving means controlled by the movement of the carriage and said control member, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

63. In a structure of the class described, the combination of a magazine, a control member, operating means for said magazine timed by said control member, a carriage, a driving mandrel mounted on said carriage and provided with driving means for said control member which is in driving relation thereto when the carriage is in its initial position, means for driving said mandrel and carriage, means for controlling said mandrel driving means controlled by the movement of the carriage and said control member, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

member operative therewith when the carriage is in its initial position, means for driving said carriage, and a stop for said control member arranged to be released by said carriage on its return to its initial position.

64. In a structure of the class described, the combination of a driving means, a control member, a record magazine, operating means for said magazine including said control member, a carriage, driving means for said control member operative therewith when the carriage is in its initial position, driving connections for the carriage to said driving means, means for controlling said driving connections including said control member, a stop for said control member arranged to be released by the carriage on its return to its initial position, a manually operated magazine adjusting means, and means for connecting and disconnecting said operating means controlled by said control member.

65. In a structure of the class described, the combination of a driving means, a control member, a record magazine, operating means for said magazine including said control member, a carriage, driving means for said control member operative therewith when the carriage is in its initial position, driving connections for the carriage to said driving means, means for controlling said driving connections including said control member, and a stop for said control member arranged to be released by the carriage on its return to its initial position.

66. In a structure of the class described, the combination of a driving means, a control member, a carriage, driving means for said control member operative therewith when the carriage is in its initial position, driving connections for the carriage to said driving means, means for controlling said driving connections including said control member, and a stop for said control member arranged to be released by the carriage on its return to its initial position.

67. In a structure of the class described, the combination of a driving means, a control member, a record magazine, operating means for said magazine including said control member, a carriage, driving means for said control member operative therewith when the carriage is in its initial position, driving connections for the carriage to said driving means, a manually operated magazine adjusting means, and means for connecting and disconnecting said operating means controlled by said control member.

68. In a structure of the class described, the combination of a driving means, a control member, a record magazine, operating means for said magazine including said control member, a carriage, driving means for

said control member operative therewith when the carriage is in its initial position, and driving connections for the carriage to said driving means.

69. In a structure of the class described, the combination of a driving means, a control member, a carriage, driving means for said control member operative therewith when the carriage is in its initial position, and driving connections for the carriage to said driving means.

70. In a structure of the class described, the combination of a sound box, record mandrels, a carriage therefor, a friction driving drum mounted on said carriage, a coacting friction driving wheel, a pivotal support therefor arranged with its axis transverse to the axis of said driven drum so that the angle of the driving wheel may be changed relative to the axis of the driven drum so that the carriage is advanced and retracted, a feed control screw and a ratchet dog co-acting therewith to control the feed in a forward direction, said dog being retracted over the screw on the return movement of the carriage, and means for reversing said driving wheel actuated by the movement of the carriage.

71. In a structure of the class described, the combination of a sound box, record mandrels, a carriage therefor, a friction driving drum mounted on said carriage, a coacting friction driving wheel, a pivotal support therefor arranged with its axis transverse to the axis of said driven drum so that the angle of the driving wheel may be changed relative to the axis of the driven drum so that the carriage is advanced and retracted, a feed control screw and a ratchet dog co-acting therewith to control the feed in a forward direction, said dog being retracted over the screw on the return movement of the carriage.

72. In a structure of the class described, the combination of a sound box, record mandrels, a carriage therefor, a friction driving drum mounted on said carriage, a coacting friction driving wheel, a pivotal support therefor arranged with its axis transverse to the axis of said driven drum so that the angle of the driving wheel may be changed relative to the axis of the driven drum so that the carriage is advanced and retracted, a feed control means for said carriage, and means for reversing said driving wheel actuated by the movement of the carriage.

73. In a structure of the class described, the combination of a sound box, record mandrels, a carriage therefor, a friction driving drum mounted on said carriage, a coacting friction driving wheel, a pivotal support therefor arranged with its axis transverse to the axis of said driven drum so that the angle of the driving wheel may be changed

relative to the axis of the driven drum so that the carriage is advanced and retracted, and a feed control means for said carriage.

74. In a structure of the class described, 5 the combination of a sound box, a carriage, a driving mandrel and a supporting mandrel mounted on said carriage, said driving mandrel being supported for limited lost motion movement relative thereto, a friction driving wheel coaxing with said driving 10 mandrel, a pivoted support therefor disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle relative to the 15 mandrel, a spring arranged to hold said driving wheel support yieldingly in its forward and reverse positions, a slide bar connected to said driving mandrel for longitudinal movement therewith, a trip arm on said 20 driving wheel support, tappets carried by said slide bar to coast with said trip arm, a sound box control member, means for actuating said sound box control member to lower the sound box comprising a lever to 25 which said sound box control member is connected, a spring arranged to act on said lever to hold it yieldingly in both positions, a feed control means for said carriage, driving connections therefor to said supporting mandrel including a gear having a pin thereon 30 adapted to engage said lever when the carriage is in its forward position so that said sound box control member is actuated to lower the sound box upon the beginning of the feed movement of the carriage, a lifting 35 bar for said sound box control member mounted upon said slide bar by means of a pair of links, and a stop on said carriage with which one of said links engages during the lost motion return movement of said 40 driving mandrel to actuate said sound box control member to raise the sound box.

75. In a structure of the class described, the combination of a sound box, a carriage, 45 a driving mandrel and a supporting mandrel mounted on said carriage, said driving mandrel being supported for limited lost motion movement relative thereto, a friction driving wheel coaxing with said driving 50 mandrel, a pivoted support therefor disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle relative to the mandrel, a spring arranged to hold said 55 driving wheel support yieldingly in its forward and reverse positions, a slide bar connected to said driving mandrel for longitudinal movement therewith, a trip arm on said driving wheel support, tappets carried 60 by said slide bar to coast with said trip arm, a sound box control member, means for actuating said sound box control member to lower the sound box, a lifting bar for said sound box control member mounted

upon said slide bar by means of a pair of 65 links, and a stop on said carriage with which one of said links engages during the lost motion return movement of said driving mandrel to actuate said sound box control member to raise the sound box. 70

76. In a structure of the class described, the combination of a sound box, a carriage, 75 a driving mandrel mounted on said carriage for limited lost motion movement relative thereto, a friction driving wheel coaxing with said driving mandrel, a pivoted support therefor disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving 80 angle relative to the mandrel to drive the same longitudinally, means for reversing said driving wheel, a slide bar connected to said driving mandrel for longitudinal movement therewith, a sound box control member, means for actuating said sound box control member to lower the sound box actuated on the initial forward movement of the carriage, a lifting bar for said sound box control member mounted upon said slide 85 bar by means of a pair of links, and a stop on said carriage with which one of said links engages during the lost motion return movement of said driving mandrel to actuate said sound box control member to raise the 90 sound box. 95

77. In a structure of the class described, the combination of a sound box, a carriage, 100 a driving mandrel mounted on said carriage for limited lost motion movement relative thereto, a friction driving wheel coaxing with said driving mandrel, a pivoted support therefor disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving 105 angle relative to the mandrel to drive the same longitudinally, means for reversing said driving wheel, a slide bar connected to said driving mandrel for longitudinal movement therewith, a sound box control member, means for actuating said sound box control member to lower the sound box actuated on the initial forward movement of the carriage, and means for raising said control 110 member including said slide bar. 115

78. In a structure of the class described, the combination of a sound box, a carriage, 120 a driving mandrel mounted on said carriage, a friction driving wheel coaxing with said driving mandrel, a pivoted support therefor disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle relative to the mandrel, means for reversing said driving wheel, a sound box control member, means for actuating said sound box control member to lower the sound box comprising 125 a lever to which said sound box control member is connected, a spring arranged to act

on said lever to hold it yieldingly in both positions, and a feed control means for said carriage including a gear having a pin thereon adapted to engage said lever when the carriage is in its forward position so that said sound box control member is actuated to lower the sound box upon the beginning of the feed movement of the carriage.

79. In a structure of the class described, the combination of a sound box, a carriage, a driving mandrel mounted on said carriage, a friction driving wheel coacting with said driving mandrel, a pivoted support therefor disposed with its axis transversely of the axis of said mandrel so that it may be adjusted to change its driving angle relative to the mandrel, means for reversing said driving wheel, a sound box control member, means for actuating said sound box control member to lower the sound box, upon the beginning of the feed movement of the carriage.

80. In a structure of the class described, the combination of a record mandrel, a carriage therefor, a friction driving drum on said carriage, a coacting friction driving wheel mounted so that its angle relative to the axis of said driving drum may be changed to advance and retract the carriage, means for automatically reversing said driving wheel actuated by the movement of the carriage, a feed control screw, and a ratchet dog coacting therewith to control the forward feed.

81. In a structure of the class described, the combination of a record mandrel, a carriage therefor, a friction driving drum on said carriage, a coacting friction driving wheel mounted so that its angle relative to the axis of said driving drum may be changed to advance and retract the carriage, means for automatically reversing said driving wheel actuated by the movement of the carriage, and a feed control means.

82. In a structure of the class described,

the combination of a record mandrel, a carriage therefor, a friction driving drum on said carriage, a coacting friction driving wheel mounted so that its angle relative to the axis of said driving drum may be changed to advance and retract the carriage, a feed control screw, and a ratchet dog coacting therewith to control the forward feed.

83. In a structure of the class described, the combination of a record mandrel, a carriage therefor, a friction driving drum on said carriage, a coacting friction driving wheel mounted so that its angle relative to the axis of said driving drum may be changed to advance and retract the carriage, and a feed control means.

84. In a structure of the class described, the combination of a record mandrel, a carriage therefor, a friction driving drum on said carriage, and a coacting friction driving wheel mounted so that its angle relative to the axis of said driving drum may be changed to advance and retract the carriage.

85. In a structure of the class described, the combination of a record magazine having a plurality of open ended record holders, a reproducer, means for moving said reproducer into playing position, means for selecting a record from any one of said record holders and moving it out of said record holder and past said reproducer with a rotary motion and in reproductive contact with said reproducer, means for replacing said record in said record holder, and means for moving said reproducer out of playing position.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

CYRUS C. SHIGLEY. [L. S.]

Witnesses:

JOSEPH RENIHAN,
CATHARINE CALLETOR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

GRAPHOPHONE NEEDLE BOX.

1,247,843 ----- K. Kawaguchi.
Patented Nov. 27, 1917.
Filed Dec. 27, 1916.

K. KAWAGUCHI.
 GRAPHOPHONE NEEDLE BOX.
 APPLICATION FILED DEC. 27, 1916.

1,247,843.

Patented Nov. 27, 1917.

2 SHEETS—SHEET 1.

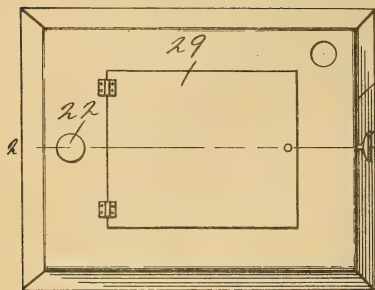


Fig. 1.

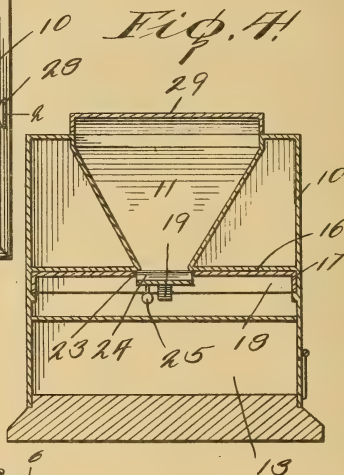


Fig. 4.

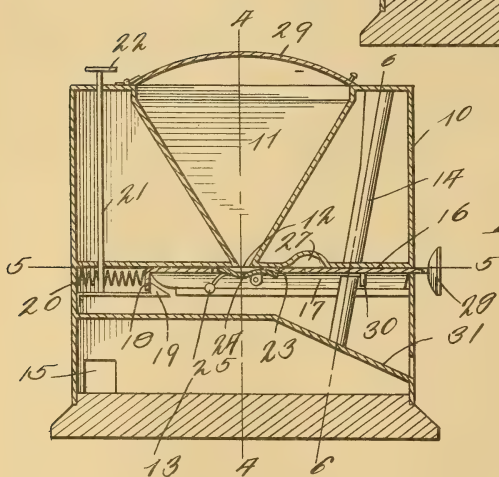


Fig. 2.

Witnesses
B. S. Brown
H. M. Reed

Inventor
K. Kawaguchi

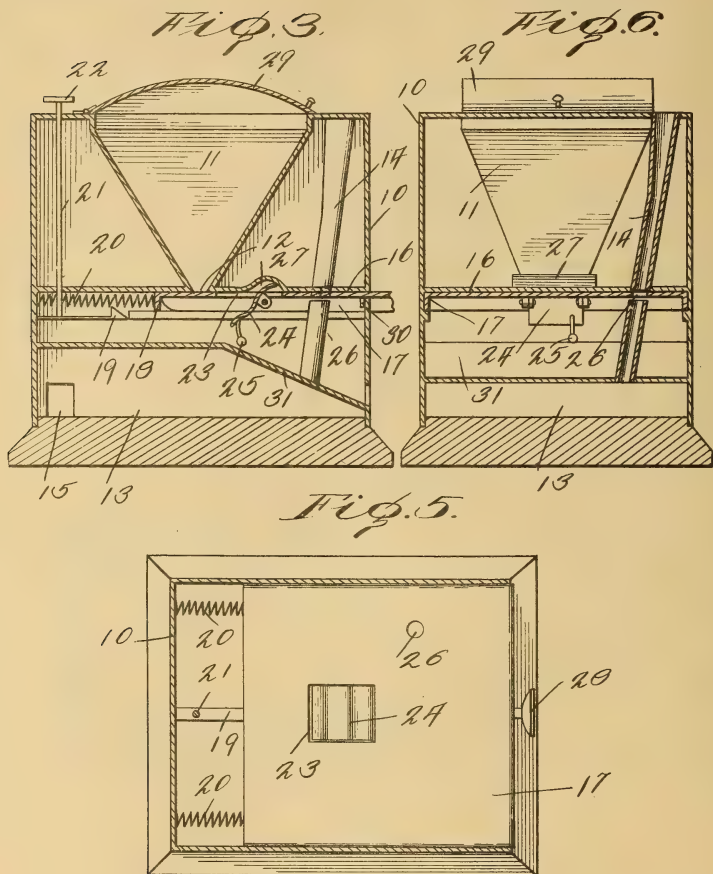
By *Charles Chandler*

Attorney

K. KAWAGUCHI.
 GRAPHOPHONE NEEDLE BOX.
 APPLICATION FILED DEC. 27, 1916.

1,247,843.

Patented Nov. 27, 1917.
 2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

KENICHI KAWAGUCHI, OF KEKAHA, TERRITORY OF HAWAII.

GRAPHOPHONE-NEEDLE BOX.

1,247,843.

Specification of Letters Patent.

Patented Nov. 27, 1917.

Application filed December 27, 1916. Serial No. 139,146.

To all whom it may concern:

Be it known that I, KENICHI KAWAGUCHI, a citizen of the United States, residing at Kekaha, in the county of Kauai, Territory of Hawaii, have invented certain new and useful Improvements in Graphophone-Needle Boxes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to single delivery receptacles, and particularly to receptacles for delivering phonograph needles one at a time.

One object of the present invention is to provide a novel and simple device of this character which is adapted to contain new or unused needles, and is also arranged to receive old or used needles.

Another object is to provide a device of this character in which there is provided novel means for delivering a single unused needle, and at the same time provide for the reception of a used needle.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawing.

In the drawing:

Figure 1 is a top plan view of my improved needle receiving and feeding device.

Fig. 2 is a longitudinal sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a similar sectional view showing the parts in the position which they assume when delivering an unused needle and for receiving a used one.

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 2.

Fig. 5 is a horizontal longitudinal sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a vertical sectional view taken on the line 6—6 of Fig. 2.

Referring particularly to the accompanying drawing 10 represents a box or casing of suitable proportions, and of general rectangular outline. In the upper portion of the box is disposed a downwardly tapering hopper 11, in which the new or unused needles are placed. In the bottom of the hopper is formed an outlet opening or slot 12, through which the needles are arranged to pass, one at a time. In the lower portion of

the box is formed a compartment 13, which receives the old or used needles, a vertical passageway 14 being formed through the forward part of the box from the top to the said compartment. A door 15 is provided for the compartment through which the used needles are extracted.

Formed through the intermediate portion of the box, below the bottom of the hopper, and from the front to the rear, is a channel 16. Disposed for slidable movement in this channel is an elongated and inverted channel member 17, the rear end of which is turned downwardly, as at 18, and is adapted to be engaged by a resilient detent 19. A coil spring 20 is disposed between the adjacent wall of the box and the downturned portion, said spring having a normal tendency to urge the channel member toward the forward side of the box. The detent may be released, however, by means of a vertical operating stem 21, which rests on the detent and extends upwardly through the top of the box where it is provided with a finger button 22. A transverse slot 23 is formed in the horizontal portion of the channel member, intermediate its length, and arranged to be normally disposed directly beneath the open bottom of the hopper for receiving a needle. Pivotaly mounted below this slot is a small receptacle 24, which receives the needles from the hopper, as will be apparent from an inspection of the drawing. The rear end of the receptacle or tray 24 has secured thereto a depending weight 25, said weight being adapted to swing the rear end of the tray downwardly when the channel member is in the limit of its forward movement. Also formed through the horizontal portion of the channel member, but forwardly of the opening 23, is a second opening 26, which, when the channel member is in its foremost position registers with the intermediate portion of the passageway 14 to permit the used needles to pass to the compartment 13. In the upper wall of the channel 16, between the passageway 14 and the bottom of the hopper, there is formed an upwardly extending recess 27, into which the forward end of the tray is adapted to swing when the same tilts under the influence of the weight. The forward or outer end of the channel member is provided with a finger button 28, by means of which the

said member may be pushed into normal position and into interlocking engagement with the detent. A suitable cover 29 is movably connected to the upper open end of the
5 hopper.

In normal position the parts are as shown in Fig. 2, and when it is desired to get a needle, the button 22 is pressed. This causes the stem to depress the detent and release
10 the latter from the channel member. The coil spring immediately forces the channel member forwardly through the channel until the lug 30 carried by the channel member, engages with the front wall of the box.
15 This disposes the opening 23 in registry with the passageway 14, and permits the old needle to drop into the compartment 13, when said needle is inserted in the upper end of the said passageway. The tray will
20 also be disposed beneath the recess 27, whereby the weight will tilt the tray rearwardly and permit the needle contained in the tray, to fall therefrom. The needle drops on an
25 incline 31, which forms a portion of the front end of the lower wall of the channel. From here the person can readily get the needle.

To restore the parts to normal position, the bottom of the channel member is pushed
30 inwardly until the detent engages with the downturned portion of the channel member at the rear end thereof.

What is claimed is:

1. A delivering and receiving receptacle for graphophone needles, consisting of a
35 box, a hopper for unused needles mounted in the box, a sliding member disposed beneath the hopper, means in the box for receiving and retaining used needles, the sliding member being formed with an opening
40 for receiving the used needles therethrough, and a gravity actuated tray carried by the sliding member for receiving an unused needle from the hopper and discharging the
45 same from the box.

2. A graphophone needle holder comprising a box, a hopper for holding unused needles, a sliding member disposed beneath
the hopper and formed with a pair of openings, a pivoted tray mounted beneath one of
50 the openings, a weight carried by the tray for tilting the same to discharge a needle, a spring engaging with one end of the sliding member to urge the same outwardly, a resilient detent engaging with the sliding
55 member for holding the same in needle receiving position, and an operating stem for releasing the detent.

In testimony whereof, I affix my signature, in the presence of two witnesses.

KENICHI KAWAGUCHI.

Witnesses:

UKICHI KAWAGUCHI,
SHIZUO OGASAWARA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND REPRODUCING APPARATUS.

1,247,861 ----- S. D. Mott.
Patented Nov. 27, 1917.
Filed Feb. 7, 1916.

S. D. MOTT.
SOUND REPRODUCING APPARATUS.
APPLICATION FILED FEB. 7, 1916.

1,247,861.

Patented Nov. 27, 1917.

Fig. 1.

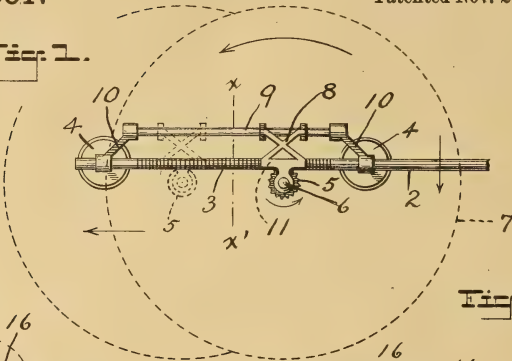


Fig. 2.

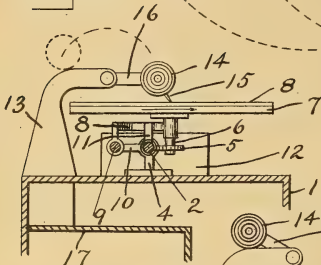


Fig. 3.

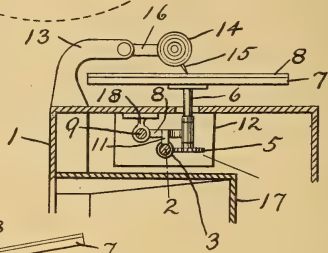


Fig. 4.

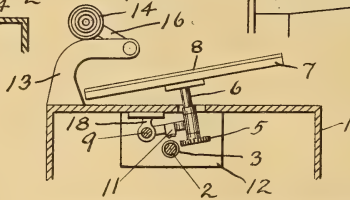
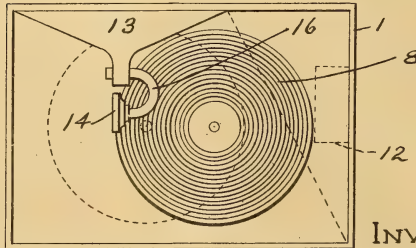


Fig. 5.



INVENTOR

Samuel D. Mott

By *Tommaso Decker*
Attorneys.

UNITED STATES PATENT OFFICE.

SAMUEL D. MOTT, OF PASSAIC, NEW JERSEY, ASSIGNOR OF ONE-HALF TO ARTHUR B. SULLIVAN, OF ALLENDALE, NEW JERSEY.

SOUND-REPRODUCING APPARATUS.

1,247,861.

Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed February 7, 1916. Serial No. 76,642.

To all whom it may concern:

Be it known that I, SAMUEL D. MOTT, a citizen of the United States, and a resident of Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Sound-Reproducing Apparatus, of which the following is a specification.

This invention relates to sound reproducing apparatus such as phonographs, gramophones and the like and more particularly to the types of apparatus known as "disk machines."

Among the objects of the invention is to attain a sound reproducing machine using a disk record in which the stylus will maintain the same relation to each record groove in which it is traveling without the provision of special compensating devices and attachments for varying the position of the stylus needle as it travels in the record groove. The most advantageous relation for the reproduction of sound is to position the stylus or needle so that it will be tangent to the record groove in which the stylus is engaged. By maintaining this position for all grooves of the record, increased life is given to the record and a more perfect reproduction of the sound is attained, as when the position of the stylus varies from tangency, the needle breaks or chips the walls of the grooves and destroys the record as well as failing in accurately reproducing all the sounds registered in the groove. I am aware that it has been heretofore proposed, especially in machines in which the record disk rotates on a fixed support and the sound box travels across it, to vary the relation of the sound box to the record as it moves across it by mechanical compensating devices of various designs, but such expedients have failed to come into commercial practice owing to the undesirability of increasing and complicating the mechanism of sound reproducing machines with the attendant unreliability. By this invention I maintain the sound box in a stationary position and cause the rotating record disk to travel with relation to it in such manner that I maintain tangency of the stylus with the groove in which it is traveling.

By this invention it is also possible to successfully employ records of almost any di-

ameter without providing the special compensating devices above referred to and which permits the reproduction of compositions heretofore not practical.

Other objects will be apparent from the subjoined description, among which might be mentioned the reduction of the number of movable joints or connections in the reproducing arm to which the sound box carrying the stylus is attached whereby the liability to loose connections owing to continued use and the consequent imperfect operation of the arm is practically overcome.

The invention consists in the improved construction and operation of sound reproducing apparatus hereinafter described and in the details of construction and combinations of parts hereinafter more particularly set forth and then specified in the claims.

In the accompanying drawings, Figure 1 illustrates in plan view the mechanism, in accordance with this invention, for rotating the record and for causing it to travel bodily, the balance of the apparatus being removed.

Fig. 2 is a side elevation and partial cross-section through a sound reproducing apparatus constructed in accordance with this invention, the cabinet containing the amplifying horn being broken away.

Fig. 3 is a similar view illustrating a slight modification in the disposition of the disk driving mechanism.

Fig. 4 is a similar view to Fig. 3 showing the parts as shifted to position to return the turntable to its original position.

Fig. 5 is a plan view of the apparatus.

In the drawings, 1 indicates a cabinet or box upon or in which the operating parts of the apparatus are mounted. 2 indicates a horizontal driving shaft provided with a screw thread or worm 3 formed thereon. The shaft 2 is rotatably mounted in suitable bearings formed in standards 4 supported by the cabinet or box 1, in the form illustrated in Figs. 1 and 2 the shaft being mount on the top of the cabinet. 5 indicates a pinion carried by a vertical spindle 6 and meshing with the screw thread or worm 3. The spindle 6 supports and carries the turntable 7 which in turn carries the record disk 8 as usual. The spindle 6 is supported and carried by an arm 8 loosely and pivotally

mounted to travel freely on a guide rod 9 supported parallel with the driving shaft 2 by brackets 10 from the standards 4.

11 indicates a toothed rack secured to the arm 8, the teeth of which are adapted to mesh with the screw thread 3 on the shaft 2. The rack 11 resting on the top of the shaft 2 supports the turntable 7 in horizontal position with the pinion 5 in mesh with the screw thread 3.

12 indicates a motor of any suitable kind for giving rotation to the driving shaft 2. Upon rotation of the shaft the pinion 5 is rotated by the screw thread 3 thus rotating the spindle 6 and turntable 7 about its axis and at the same time by means of the engagement of the rack 11 with the screw thread 3 the spindle 6 and turntable 7 are carried bodily and longitudinally of the driving shaft, the various directions of rotation and travel being indicated by arrows in Fig. 1.

The turntable 7 may be returned to its initial or any other position at any time by swinging the arm 8 upward about its pivot connection on the guide rod 9 which action removes both the rack 11 and pinion 5 from engagement with the screw thread 3.

13 indicates a reproducer arm fixedly mounted on the cabinet 1 in a stationary position. The reproducer arm is provided with a sound box 14 of any desired construction having a stylus or needle 15 adapted to travel in the record grooves in the disk 5 as well known in the art. The sound box is pivotally connected with the reproducer arm by the usual gooseneck 16 so that the sound box and stylus may be swung away and held free of the record as usual.

The reproducer arm 13 passes down into the cabinet 1 and terminates in an amplifying horn 17 of any desired construction or arrangement. The location or arrangement of the amplifying horn forms no part of the present invention and further illustration is deemed unnecessary.

In the form of the invention shown in Figs. 3 and 4 the parts and operation are the same as above described except that they are located within the cabinet 1 and the driving shaft 2 is supported in the sides thereof while the guide rod 9 is supported in standards 18 depending from the top of the cabinet.

In both forms rotation of the shaft 2 by means of the motor causes the record disk to rotate and travel bodily under the stylus 15 which traveling in the grooves of the record reproduces the sounds recorded therein. It will be noted that the stylus remains in one vertical position and is at all times tangent to the record groove in which it is traveling, the pitch of the screw, rack and pinion being synchronized with the record grooves.

It will be understood that the invention is

not limited to the arrangement or construction of parts except as may be specified in the appended claims.

By the term "stationary sound box" herein it will be understood that a sound box which does not move or travel in a horizontal plane is intended as it may move in a vertical plane to follow the undulations of the record disk.

What I claim as my invention is:—

1. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a rotatable feed screw and means engaging said feed screw and adapted to rotate said turntable and move it bodily with respect to said stylus and sound box.

2. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a feed screw and an arm carrying said turntable and having means engaging said feed screw to rotate said turntable and move it bodily with respect to the stylus and sound box.

3. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a feed screw and a pivoted arm having means engaging said feed screw and adapted to rotate said turntable and move it bodily with respect to said stylus and sound box.

4. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a feed screw, a pinion engaging said feed screw for rotating said turntable and means also engaging said feed screw for moving said turntable bodily with respect to said stylus and sound box.

5. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a feed screw, a pivoted arm carrying said turntable, a pinion engaging said feed screw for rotating said turntable and a toothed rack also engaging said feed screw for moving said turntable bodily with respect to said stylus and sound box.

6. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a rotatable feed screw and means engaging said feed screw and adapted to rotate said turntable and move it bodily with respect to said stylus and sound box, said means also being adapted to be lifted out of engagement with said feed screw to permit said turntable to be moved independently said feed screw.

7. In an apparatus for reproducing sound, the combination of a stationary reproducer arm, sound box and stylus, a turntable, a feed screw, a rod running parallel to

said feed screw, an arm pivoted to said rod and supporting said turntable, a pinion engaging said feed screw and connected with said turntable for rotating the same and a
5 toothed rack carried by said arm and also engaging said feed screw for moving said turntable bodily with respect to said stylus and sound box, said arm being adapted to be raised on its pivot to release said pinion and

toothed rack from their engagement with 10 said feed screw.

Signed at New York, in the county of New York and State of New York, this 1st day of February, A. D. 1916.

SAMUEL D. MOTT.

Witnesses:

F. B. TOWNSEND,
IRENE LEFKOWITZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

REPEATING DEVICE FOR TALKING MACHINES.

1,248,041 ----- G. F. Voith.
Patented Nov. 27, 1917.
Filed March 27, 1917.

G. F. VOITH.
 REPEATING DEVICE FOR TALKING MACHINES.
 APPLICATION FILED MAR. 27, 1917.

1,248,041.

Patented Nov. 27, 1917.
 2 SHEETS—SHEET 1.

Fig. 1.

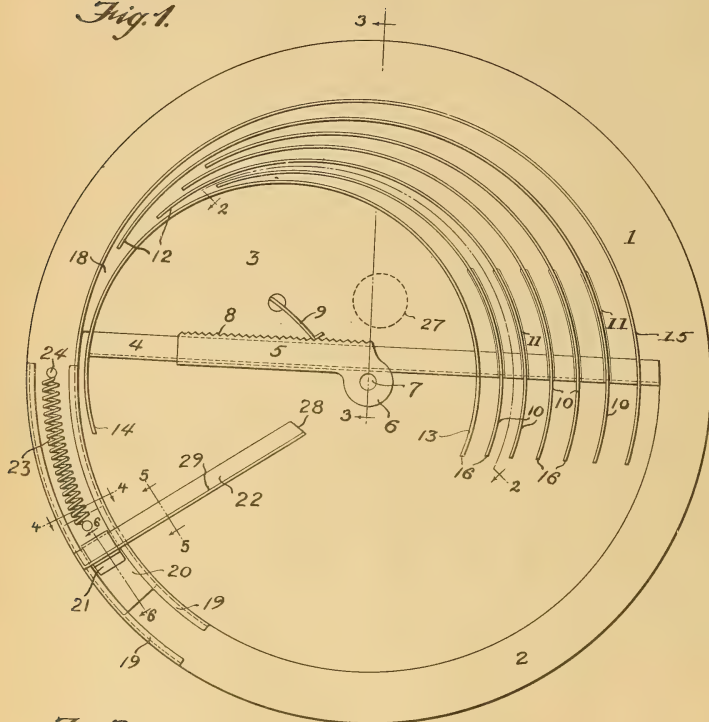
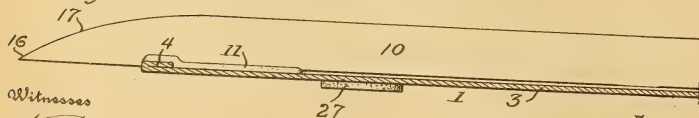


Fig. 2.



Witnesses

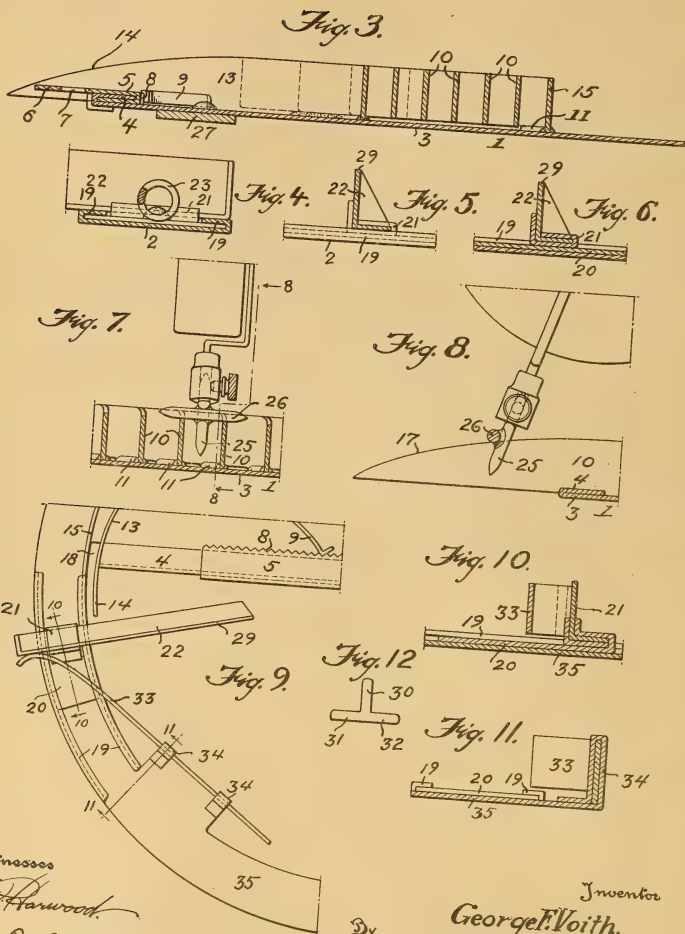
H. Hamwood.
C. R. Ziegler.

Inventor

George F. Voith.
 By *Joshua R. H. Kottke.*
 His Attorney

1,248,041.

Patented Nov. 27, 1917.
 2 SHEETS—SHEET 2.



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C. R. Ziegler.

Inventor
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 By *Joshua R. H. Hottel.*
 His Attorney

UNITED STATES PATENT OFFICE.

GEORGE F. VOITH, OF PHILADELPHIA, PENNSYLVANIA.

REPEATING DEVICE FOR TALKING-MACHINES.

1,248,041.

Specification of Letters Patent.

Patented Nov. 27, 1917.

Application filed March 27, 1917. Serial No. 157,823.

To all whom it may concern:

Be it known that I, GEORGE F. VOITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Repeating Devices for Talking-Machines, of which the following is a specification:

My invention consists of a repeating device for talking machines. One object of my invention is to provide a device which can be quickly and easily attached to a talking machine and which will efficiently operate to effect the movement of the reproducing elements of the talking machine to repeat the record.

Another object is to so construct my invention that it will not injure any of the several parts of the talking machine or record.

Another object is to so design my invention that it will be durable and of comparatively simple construction.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a top plan view of my improved repeating device.

Fig. 2 is a section on the line 2-2 of Fig. 1.

Fig. 3 is a section on the line 3-3 of Fig. 1.

Fig. 4 is a section on the line 4-4 of Fig. 1.

Fig. 5 is a section on the line 5-5 of Fig. 1.

Fig. 6 is a section on the line 6-6 of Fig. 1.

Fig. 7 is a fragmentary sectional elevation showing certain of the elements of my invention.

Fig. 8 is a section on the line 8-8 of Fig. 7.

Fig. 9 is a fragmentary plan view showing a modification of certain of the parts illustrated in Fig. 1.

Fig. 10 is a section on the line 10-10 of Fig. 9.

Fig. 11 is a section on the line 11-11 of Fig. 9, and

Fig. 12 is a view of a cross arm which I may employ in combination with the ordinary form of phonograph needle and in-

stead of the specially constructed needle shown in Figs. 7 and 8.

Referring to Figs. 1 to 8 inclusive, 1 represents a plate which is preferably made of sheet metal and includes a ring section 2 and a solid section 3. The solid section 3 has a turned edge 4 upon which a section 5 slides. This section 5 has a projection 6 provided with a hole 7 through which the turn table post of the talking machine extends and thus provides the center of rotation for the plate 1.

The section 5 is notched, as shown at 8, on its inner edge for the engagement of a spring detent 9 which is secured to the solid section 3 of the plate 1, the object being to hold the centering section 5 in various positions on the turned edge 4.

The solid section 3 forms a support for a plurality of rails 10, said rails being soldered throughout a portion of their length, adjacent the turned edge 4 as illustrated at 11. These rails are preferably made of thin resilient metal, their inner ends 12 being freely movable in a plane parallel with the upper surface of the plate 1.

An inner rail 13 is secured to the solid section 3, and at one end projects beyond the turned edge 4 as shown at 14. An extreme outer rail 15 is secured, preferably throughout its entire length, to the solid section 3.

The ends 16 of all of the rails extend within the ring section 2, and the upper edges of these ends of the rails slant or taper as shown at 17 (see Figs. 2, 3, and 8). As illustrated in Fig. 1, all of the rails are curved, and at their ends 16 are spaced farther apart than at the ends 12. The curvature and arrangement of the rails is such that at the ends 16, the rails are spaced relatively far apart and gradually become closer together until all the intermediate rails open into the space 18 between the rail 13 and rail 15. Thus, the rails are located in a substantially spiral formation as clearly illustrated in Fig. 1.

The ring section 2 has an overturned portion 19 on its upper surface which provides a slideway for a carriage 20. This carriage supports a member 21 which in turn provides a guideway for an arm 22 which is preferably angular in cross section as clearly illustrated in Fig. 5.

The member 21 can be soldered or other-

wise secured to the carriage 20, so that said member and the carriage move as a unit within the slideway 19, and the arm 22 is designed to slide longitudinally toward and
5 from the center of the plate 1. A coiled spring 23 has one end attached to the carriage 20 and the other end attached to the plate 1 as shown at 24. This spring 23 serves as a buffer or to compensate for the
10 jar caused by the engagement of the arm 22 with certain of the recording elements of the talking machine as will hereinafter be more fully described.

In the use of my invention, I preferably
15 provide a four-pointed needle, one leg of which can be inserted within the usual needle carrier on a talking machine so that the point 25 will engage the grooves of the record, the other leg 26 extending substantially at right angles thereto and being
20 operative when engaged by any of the tapered portions 17 of the rails to be lifted so that the point 25 is raised above the level of the record, and also above the upper surface of
25 the plate 1.

I preferably cover the bottom of the plate 1 with soft material such as felt or other cloth, and provide a balancing pad 27 which
30 depends from the lower surface of the plate 1. The location of this pad is dependent upon the balancing point of the entire device and can be made of soft material so as not to injure the record by coming in contact with it.

35 In order to properly locate this pad, I first balance the device, for example as upon the end of a finger of one hand, and on the spot upon which the device balances on the finger, I paste or otherwise secure the
40 balancing pad. The construction is such that the balancing pad normally forms the sole support of the device on the record so that the major portion of the device is held in a position spaced from the upper surface of
45 the record. Furthermore, the general shape of the device is such that the balancing point upon which the pad is mounted is adjacent the center of the plate 2 so that the pad rests upon the record near the center of the
50 latter where there are no sound reproducing grooves. In this manner the reproduction portion of the record is not injured by the rotation of the record under the device, since the record engages the balancing pad
55 and rotates thereunder.

In the operation of my invention, the plate 1 is placed upon the record of the talking machine, the post of the talking machine extending through the hole 7 of the
60 centering section 5, the space 18 being located adjacent the initial recording groove of the record. This position can be attained by sliding the section 5 longitudinally along the turned edge 4 and against the action of
65 the spring detent 9. The arm 22 is then slid

until its inner end 28 lies directly above the last recording groove of the record. The needle point 25 is then inserted in the usual manner within the outer groove and the
70 needle carrier is permitted to rest against the edge 29 of the arm 22.

The rotation of the record will cause the needle carrier to move inwardly along the edge 29 of the arm 22 during which time the record is being produced. When the needle
75 carrier has reached the end 28 of the arm 22 and becomes free thereof, the record will rotate the entire plate 1 and cause the transversely extending arm 26 of the needle to be engaged by the tapered portions 17 of the
80 rails which are moving within the path occupied by the needle.

The engagement of the tapered portions of the rails will raise the needle from the grooves of the record and will also raise
85 the needle point above the upper surface of the plate 1 as clearly shown in Figs. 7 and 8, so that the needle point will not be injured by coming in contact with the top of the plate or with any portion thereof.
90

As the plate rotates, the needle will follow the path provided by the rails upon which it rests and will eventually ride upon the upper edges of the rails 13 and 15 where the latter forms the space 18 and are
95 close together as shown on the left hand side of Fig. 1, thus the arm 22 will again engage the needle carrier and the rails 13 and 15 will return the needle to the initial recording groove and the operation will be repeated.
100

The spring 23 serves to prevent any harsh action or injury to the machine, and relieves the jar which would otherwise occur if the arm 22 were made permanent or secured
105 direct to the plate 1.

It will be noted that my invention can be employed to suit records of various diameters, it only being necessary to move the centering slide 5 along the turned edge 4, and furthermore, the arm 22 is made
110 sufficiently long to accommodate various areas of recording grooves on various size records.

Instead of having the specially constructed four pointed needle as above described, I can use a cross arm for example, as shown
115 in Fig. 12, and this cross arm can be used with the usual form of single pointed needle now in common use merely by inserting the stem 30, together with the needle, within the needle carrier, and when so used the
120 transversely extending arms 31 and 32 will be engaged by the tapered portions 17 of the rails and the needle will be lifted above the record and above the top surface of the plate 1.
125

In the form of my invention shown in Fig. 9, I have illustrated a spring 33 which is preferably made of flat resilient metal and this spring is positioned to the rear of the arm 22. The spring 33 is mounted in
130

supports 34 on the ring section 35 which corresponds in all other respects with the ring section 2 above mentioned.

Furthermore, in this form of my invention, instead of the arm 22 being pulled by a spring, as for example the spring 23, it is backed by the spring 33, and the spring 33 therefore acts to cushion and to take up the jar caused by the engagement of the arm 22 with the needle.

In all other respects the form of my invention shown in Fig. 9 is similar to that above described in connection with Figs. 1 to 8 inclusive, and I have therefore given similar parts corresponding reference numerals.

By mounting the rails so that their inner ends are free to flex, I avoid any harsh scraping action and undesirable noise, since the rails gradually compel the needle to be returned to the initial position.

Furthermore, by balancing the plate 1, it is normally kept free of the reproducing portion of the record and the weight of the parts is such that the balancing pad comes within the space of the record not occupied by the reproducing grooves. My invention is therefore extremely practical and effectively operates for the purposes set forth.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A repeating device for talking machines, comprising a plate, rails mounted on said plate, and means for engagement with a reproducing element of the talking machine during the reproduction of a record, said rails having portions designed to lift said reproducing element above the plane of movement of the plate and other portions designed to return said element to the initial reproducing portion of the record, substantially as described.

2. A repeating device for talking machines including a plate, rails made of resilient material and secured for a portion of their length to said plate and having other portions freely movable in a plane parallel with the top surface of the plate, substantially as described.

3. A repeating device for talking machines including a plate, rails made of resilient material and secured for a portion of their length to said plate and having other portions freely movable in a plane parallel with the top surface of the plate,

outer and inner rails forming an inclosure for said first-mentioned rails and between which said free ends of the first-mentioned rails are designed to move, substantially as described.

4. A repeating device for talking machines, comprising a plate, rails mounted on said plate, means for engagement with a reproducing element of the talking machine during the reproduction of a record, said rails having portions designed to lift said reproducing element above the plane of movement of the plate and other portions designed to return said element to the initial reproducing portion of the record, and a movable centering section mounted on said plate, substantially as described.

5. A repeating device for talking machines, comprising a plate, rails mounted on said plate, means for engagement with a reproducing element of the talking machine during the reproduction of a record, said rails having portions designed to lift said reproducing element above the plane of movement of the plate and other portions designed to return said element to the initial reproducing portion of the record, a centering section slidably mounted on said plate and having a notched portion, and a detent secured to said plate and designed to engage the notch portion of this centering section, substantially as described.

6. A repeating device for talking machines comprising a plate, rails mounted on said plate, a carriage movable on said plate, an arm slidable relatively to said carriage, and resilient means connecting the carriage with the plate, said arm being designed to engage a reproducing element of the talking machine during the reproduction of a record and to free itself of said element when the record has been completely reproduced, substantially as described.

7. A repeating device for talking machines comprising a plate, rails mounted on said plate, a carriage movable on said plate, an arm slidable relatively to said carriage, resilient means connecting the carriage with the plate, said arm being designed to engage a reproducing element of the talking machine during the reproduction of a record and to free itself of said element when the record has been completely reproduced, said rails having portions designed to lift said reproducing element above the plane of movement of the plate and other portions designed to return said element to the initial reproducing portion of the record, substantially as described.

8. A repeating device for talking machines comprising a plate, rails mounted on said plate, a carriage movable on said plate, an arm slidable relatively to said carriage, resilient means connecting the carriage with the plate, said arm being designed to en-

gage a reproducing element of the talking machine during the reproduction of a record and to free itself of said element when the record has been completely reproduced, 5 said rails having tapered end portions designed to lift said reproducing element above the plane of movement of the plate, and other portions designed to return said element to the initial reproducing portion of 10 the record, substantially as described.

9. A repeating device for talking machines, comprising a plate, rails mounted on said plate, means for connection with the talking machine needle carrier having a 15 transversely extending leg, means carried by said plate for engagement with said first means, said rails having portions designed to lift said transversely extending leg and thereby raise the needle above the record and 20 plate, said rails having other portions designed to return said needle to the initial reproducing portion of the record, substantially as described.

10. A repeating device for talking ma-

chines, comprising a plate, rails mounted on 25 said plate, a needle for connection with the talking machine needle carrier having leg portions arranged transversely to each other and provided with points, certain of the leg 30 portions being in alinement with the needle carrier while the other leg portions are arranged transversely thereto, means carried by said plate for engagement with said 35 needle, said rails having portions designed to lift said transversely extending leg portions of the needle and thereby raise the needle above the record and plate, said rails 40 having other portions designed to return said needle to the initial reproducing portion of the record, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE F. VOITH.

Witnesses:

MARY A. INGLAR,
CHAS. E. POTTS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX

1,248,062 ----- H. L. Berger & F.C.Knoche

Patented Nov. 27, 1917.

Filed August 13, 1917.

H. L. BERGER & F. C. KNOCHEL.
SOUND BOX.

APPLICATION FILED AUG. 13, 1917.

1,248,062.

Patented Nov. 27, 1917.

FIG. 1.

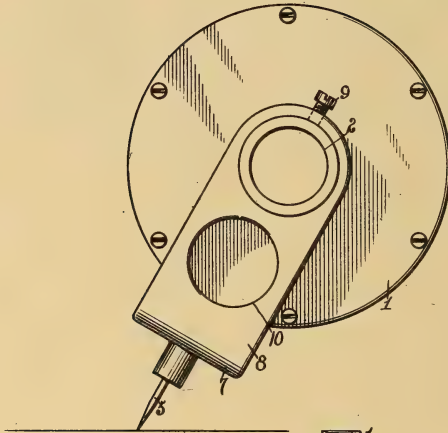
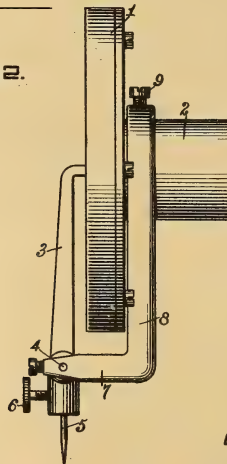


FIG. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

HERMAN L. BERGER AND FRANCIS C. KNOCHEL, OF NEW YORK, N. Y.

SOUND-BOX.

1,248,062.

Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed August 13, 1917. Serial No. 185,874.

To all whom it may concern:

Be it known that we, HERMAN L. BERGER and FRANCIS C. KNOCHEL, citizens of the United States, and residents of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Sound-Box, of which the following is a full, clear, and exact description.

This invention relates to sound boxes for talking machines, and has for an object the provision of an improved construction whereby the vibration of the sound box will not be transmitted to the stylus.

Another object in view is to provide a separate support for a stylus formed independent of the parts forming the sound box proper, in order that none of the vibration or movement of the stylus caused by the grooves in a record shall be transmitted to the diaphragm.

In the accompanying drawing:

Figure 1 is a rear view of a sound box disclosing an embodiment of the invention.

Fig. 2 is an edge view of the sound box shown in Fig. 1.

Referring to the accompanying drawing by numerals, 1 indicates a sound box of any desired kind having a tubular extension 2 for being placed in position in the usual goose neck of a talking machine. The diaphragm of the sound box 1 has an arm 3 connected therewith, said arm being pivotally supported by a journal member 4, rotatably mounted in the extension 7 of the plate 8. The arm 3 at its lower end carries a stylus 5 held in position by any suitable means, as for instance thumb screw 6. The plate 8 is provided with an opening at the upper end sufficiently large to slidably fit on the extension 2 to which it may be clamped by a set screw 9. A second opening 10 may be provided for the purpose of reducing the weight although this is not absolutely necessary. The plate 8 is com-

paratively thick and rigid so that when it is clamped to the tubular member 2 a rigid support is provided for the stylus 5 and the arm 3. The plate 8 is adjustably mounted in a sleeve so as to be moved toward and from the sound box. This movement will naturally shift the position of the stylus arm 3 and the needle 5. This adjustability is provided in order that the vibration set up in the plate 8 and that set up in the stylus 3 may be in a certain sense synchronized for clarifying the sound produced by the diaphragm.

What we claim is:

1. In a device of the character described, a sound box, a supporting sleeve extending therefrom, a stylus arm connected to the diaphragm of the sound box, a plate slidably mounted on said sleeve, means for clamping said plate at any desired point on said sleeve, said sleeve being formed with an extension at the lower end, and means for pivotally mounting said stylus arm on said extension.

2. In a device of the character described, a sound box provided with a sleeve, a stylus arm connected with the diaphragm of the sound box, a plate adjustably mounted on said sleeve so as to be moved toward and from said sound box, said plate being formed with an extension at one end, and means for engaging said extension and said stylus arm for pivotally mounting the stylus arm on said extension.

3. In a device of the character described, a sound box provided with a sleeve, a diaphragm, a stylus arm connected to said diaphragm at one end, a supporting plate adjustably mounted on said sleeve, means for pivotally connecting one end of said stylus arm to said plate, and means for locking said plate at any desired point along said sleeve for causing a balancing or synchronizing of the vibrations of the sleeve and stylus arm.

HERMAN L. BERGER.
FRANCIS C. KNOCHEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RECORD CLEANER FOR SOUND-REPRODUCING MACHINES.

1,248,063 ----- J. N. Blackman,
Patented Nov. 27, 1917.
Filed June 15, 1917.

J. N. BLACKMAN.
 RECORD CLEANER, FOR SOUND REPRODUCING MACHINES,
 APPLICATION FILED JUNE 15, 1917.

1,248,063.

Patented Nov. 27, 1917.

Fig. 1.

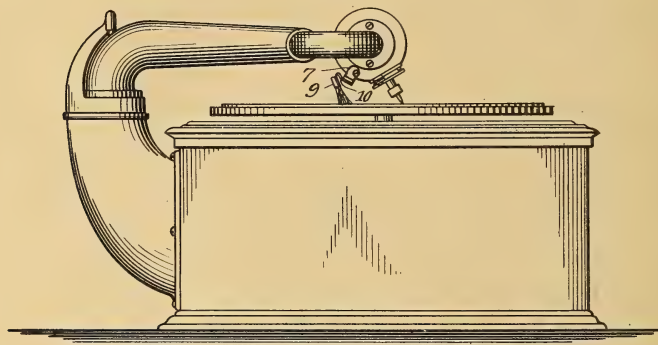


Fig. 2.

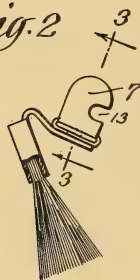


Fig. 3.

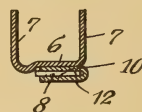


Fig. 4.

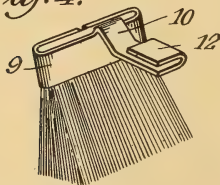


Fig. 5.



Joseph Newcomb Blackman
 Inventor

By his Attorneys

August Clark

UNITED STATES PATENT OFFICE.

JOSEPH NEWCOMB BLACKMAN, OF NEW YORK, N. Y.

RECORD-CLEANER FOR SOUND-REPRODUCING MACHINES.

1,248,063.

Specification of Letters Patent.

Patented Nov. 27, 1917.

Application filed June 15, 1917. Serial No. 174,838.

To all whom it may concern:

Be it known that I, JOSEPH NEWCOMB BLACKMAN, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented a new and useful Improvement in Record-Cleaners for Sound-Reproducing Machines, of which the following is a specification.

My invention relates to record cleaners for sound reproducing machines of the type described and claimed generically in United States patent to Henry A. Place, dated September 25, 1906, No. 831,987, and in which a brush-holding arm is fixed to an attaching clamp having opposite spring fingers to clasp the sound box, sound tube or member which moves over the record, so that the cleaner can be quickly attached to or detached from the movable member, and can be adjusted thereon so as to bear at the proper point and with the proper amount of pressure on the record in front of the following stylus.

In Letters Patent No. 865,674, issued to me September 10, 1907, I have described a specific improvement on said generic invention, in which the spring fingered reproducer clasp is formed integrally with the brush holding clamp and arm. The specific examples of the invention shown in the said Place patent are also made in this way.

The disadvantage of this specific construction is that whereas the material of the brush-holding clamp should be soft and pliable properly to bind the brush bristles when set thereon, and the reproducer clasp should be of elastic material so as properly to grip the reproducer, the integral construction of the brush clamp and reproducer clasp does not permit such a divergent construction.

My present specific improvement on the said Place invention, therefore, consists of a pliable brush clamp permanently attached to an elastic reproducer clasp, substantially as hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming part of this specifica-

tion in which like parts are designated by the same numbers in all the figures.

Figure 1 represents a record cleaner embodying my present invention, attached to the sound box of an ordinary Victor talking machine.

Figs. 2, 3, 4 and 5 are enlarged detail views showing the novel construction of the said record cleaner.

In making the record cleaner thus illustrated, I make the reproducer clasp of a piece of resilient metal, as best shown in Fig. 5, bent to form the base 6, which bears crosswise against the circumferential face of the sound box, spring fingers 7 on the opposite ends of said base to bear elastically against the opposite sides of the rim of the sound box, and folds 8 bent inward from opposite sides of the base 6, over the face opposite the spring fingers 7.

The brush-holding clamp 9 and arm 10, as best shown in Fig. 4, I make of a single piece of pliable metal, one side of the brush clamp 9 having an integral extension bent downward angularly to form the brush-holding arm 10, the side of which at the end has an integral extension which is folded laterally over the arm to form a tongue 12.

The brush-holding clamp and arm thus formed is permanently attached to the reproducer clasp by introducing the pliable tongue 12 between the resilient base 6 and resilient folds 8 of the reproducer clasp, and binding the tongue 12 securely therebetween by pressing the pliable brush tongue 12 and pliable brush arm 10 tightly together, as shown in Figs. 1, 2 and 3.

The reproducer clasp is preferably formed with a slot 13 to secure the sound box screw, and is attached to the sound box as shown in Fig. 1, and described in my said prior Patent No. 865,674.

I claim as my invention:

1. A record cleaning attachment, consisting of a brush clamp having a folded extension and a reproducer clasp, having opposite spring fingers, and a folded extension bound in the folded extension of the brush clamp.

2. A record cleaning attachment, consisting of a brush clamp and extension of non-resilient material, a reproducer clasp and extension of resilient material, the resilient
5 extension of the reproducer clasp being bound between folds of the non-resilient extension of the brush clamp. 10

3. A record cleaning attachment consist-

ing of a brush clamp formed with an arm having a tongue folded over it, and a reproducer clasp having lateral extensions of its base folded over the base and bound between the arm and tongue of the brush clamp.

JOSEPH NEWCOMB BLACKMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RECORD CLEANER FOR SOUND REPRODUCING MACHINES.

1,248,064 ----- J. N. Blackman,
Patented Nov. 27, 1917,
Filed June 18, 1917.

J. N. BLACKMAN.
RECORD CLEANER FOR SOUND REPRODUCING MACHINES.
APPLICATION FILED JUNE 15, 1917.

1,248,064.

Patented Nov. 27, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

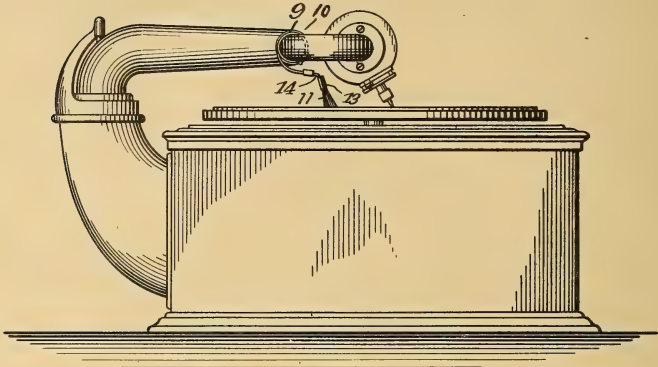


Fig. 2.

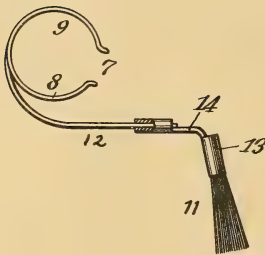
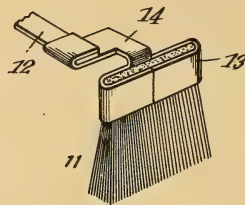


Fig. 3.



Joseph Newcomb Blackman
Inventor

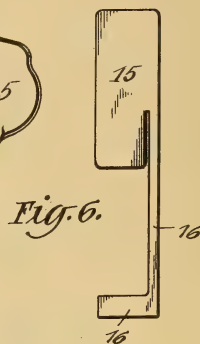
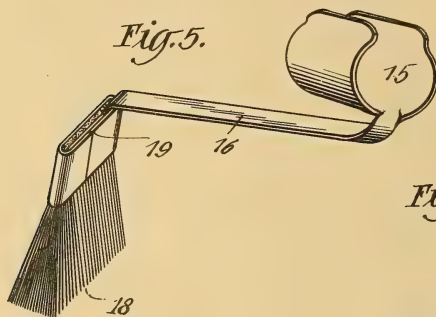
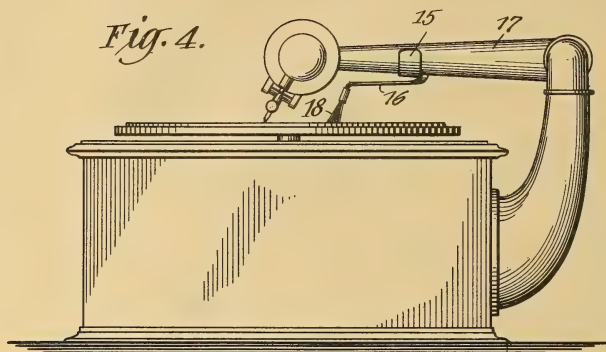
By his Attorneys

Burgess & Clarke

J. N. BLACKMAN.
RECORD CLEANER FOR SOUND REPRODUCING MACHINES,
APPLICATION FILED JUNE 15, 1917.

1,248,064.

Patented Nov. 27, 1917.
2 SHEETS—SHEET 2.



Joseph Newcomb Blackman
Inventor

By his Attorneys

Burgess Clark

UNITED STATES PATENT OFFICE.

JOSEPH NEWCOMB BLACKMAN, OF NEW YORK, N. Y.

RECORD-CLEANER FOR SOUND-REPRODUCING MACHINES.

1,248,064.

Specification of Letters Patent.

Patented Nov. 27, 1917.

Application filed June 15, 1917. Serial No. 174,839.

To all whom it may concern:

Be it known that I, JOSEPH NEWCOMB BLACKMAN, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented a new and useful Improvement in Record - Cleaners for Sound - Reproducing Machines, of which the following is a specification.

My invention relates to record cleaners for sound reproducing machines of the type described and claimed generically in United States patent to Henry A. Place, dated September 25, 1906, No. 831,987, and shown in United States patent to C. E. Tackman, dated November 28, 1916, No. 1,206,168, in each of which a brush-holding arm is fixed to an attaching clamp having opposite spring fingers to clasp the sound box, sound tube, or other part of the reproducer, which moves over the record, so that the cleaner can be attached to or detached from the movable member, and will brush and clean the record in front of the following stylus.

In the specific examples of said invention illustrated in said patent to Place, the brush-holding arm is made integral with and fixed directly to the reproducer clasp.

In my present improvement, I make the adjustable reproducer clasp of elastic or resilient metal or material to embrace yieldingly the sound tube and bend and extend the elastic material thereof almost horizontally toward the stylus so as to form a light vertically springing arm, to the free end of which the brush clamp is attached. By this construction the brush can be adjusted on the sound tube both radially and vertically with respect to the record, and when properly adjusted will bear yieldingly and lightly on the record in front of the stylus, so as to accommodate itself to all variations in the record or reproducer mechanism, while bearing at all times with uniform light pressure on the record.

In order that my invention may be fully understood, I shall first describe in detail the mode in which I at present prefer to produce the invention and then distinctly claim the same.

Reference is to be had to the accompanying drawings forming part of this specification, in which like parts are designated by the same numbers in all the figures.

Figure 1 represents a record cleaner em-

bodying my present invention applied to an ordinary phonograph of the Victor type.

Figs. 2 and 3 are enlarged detail views of the said cleaner.

Fig. 4 represents a modified form of cleaner embodying my present invention, applied to a phonograph of the Columbia type.

Figs. 5 and 6 are enlarged detail views of the latter cleaner.

I prefer to make the reproducer clasp of the form of record cleaner shown in Figs. 1, 2 and 3, of a flat piece of resilient metal, the opposite spring fingers 8 and 9 of which are bent in circular form yieldingly to clasp the sound tube 10 of the reproducer, so that the clasp 7 thus formed can be easily slipped on or off the sound tube, and can be readily adjusted longitudinally thereof and peripherally thereon so as to cause the cleaning brush 11 supported thereby to bear at the proper point on the record ahead of the stylus, and with the requisite amount of pressure on the record to free the same of dust without retarding the rotation of the same.

A piece of the resilient metal of which the clasp 7 is formed, is extended lengthwise and almost horizontally toward the stylus below the sound tube, so as to form a long, vertically and lightly springing arm 12 to the end of which the clamp 13 holding the brush 11 is permanently attached, in the present example of my invention, by bending and extending a piece of the pliable metal of which the brush clamp 13 is formed, away from the stylus to form a brush-holding arm 14, which is folded tightly over the end of the springing compensating arm 12, so as to retain the same securely.

With this nearly horizontal compensating arm 12, the brush will rise and fall vertically to adjust itself to all inequalities of the record or reproducing mechanism, and will always bear with uniform pressure on the record, so as effectually to clear the sound grooves of dust, without injuriously affecting the working of the record and reproducer mechanism.

In the form of my invention shown in Figs. 4, 5 and 6, the spring-fingered reproducer clasp 15 and vertically springing compensating arm 16 are likewise, by preference, made of one piece of resilient material,

but, to suit the different arrangement of the Columbia sound tube 17, the compensating arm 16 is bent approximately parallel with the axis of the clasp 15, and the free end of the compensating arm 16 is, in this example, clamped with the bristles of the brush 18, within the pliable metal of the brush clamp 19.

This form of the cleaning attachment permits the same longitudinal and peripheral adjustment of the brush on the sound tube with respect to the stylus, and gives the brush the same compensating action with

respect to the record and reproducer mechanism, as the example of my invention shown in Figs. 1, 2 and 3. 15

I claim as my invention:

A record cleaning attachment, consisting of a reproducer clasp, a vertically and lightly springing compensating arm extended almost horizontally from the reproducer clasp toward the stylus, and a brush clamp of non-resilient metal clamping the end of the resilient compensating arm. 20

JOSEPH NEWCOMB BLACKMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ATTACHMENT FOR SOUND BOXES.

1,248,098 ----- H. Faust, Jr.,

Patented Nov. 27, 1917.

Filed Apr. 14, 1917.

1,248,098.

Πρό. 1.

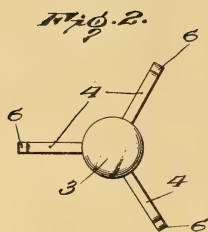


Fig. 2.

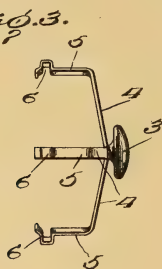


Fig. 3.

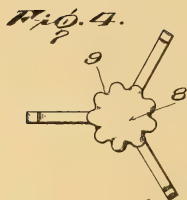


Fig. 4.

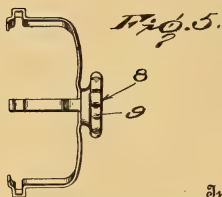


Fig. 5.

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W. A. Rancey, Attorneys.

UNITED STATES PATENT OFFICE.

HENRY FAUST, JR., OF ST. LOUIS, MISSOURI.

ATTACHMENT FOR SOUND-BOXES.

1,248,098.

Specification of Letters Patent.

Patented Nov. 27, 1917.

Application filed April 14, 1917. Serial No. 162,112.

To all whom it may concern:

Be it known that I, HENRY FAUST, Jr., a citizen of the United States, residing in the city of St. Louis and State of Missouri, have
5 invented certain new and useful Improvements in Attachments for Sound-Boxes, of which the following is a specification.

This invention is an attachment for the sound boxes of graphophones and like instruments. One object of the invention is to provide an inexpensive and slightly attachment for sound boxes which may be readily handled by an operator when changing records, and which will protect the records, as
10 well as the delicate mechanism of the sound box, from injury by contact with the fingers of the operator. A further object of the invention is to provide a device which may be readily applied to or removed from the
15 sound box and which will enable the operator to easily and conveniently shift the sound box when changing records or needles without forcing his arm, fingers, or wrist into an awkward position.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a sound box having my invention applied thereto;

Fig. 2 is a plan view, and

30 Fig. 3 an edge view of the attachment as shown in Fig. 1;

Figs. 4 and 5 are respectively a plan view and an edge view of a slightly different form of the device.

35 The sound box 1 and the goose neck or sound tube 2 may be of any well known form and are illustrated in the accompanying drawings in a conventional manner only, as they form no part of my invention and are
40 shown only in order that the application of the attachment may be readily understood.

In carrying out my invention, I employ a central body 3 which may be in the form of an ordinary knot, as illustrated in Figs. 1,
45 2 and 3 and from the said central member or knob resilient holding arms 4 radiate. Three of these arms are shown in the accompanying drawings and will generally be found sufficient but it is to be understood
50 that the exact number of arms is immaterial and may be varied to suit the demands of any particular form of sound box or the wishes of any particular user. The ends of the arms 4 are turned away from the central
55 member or body 3 so as to extend over the side of the sound box, as indicated at 5, and

the extremities of the longitudinally extending portions 5 are doubled upon themselves to provide hooks or catches 6 adapted to engage the bead or flange 7 on the sound box. 60

The exact configuration given the central member 3 and the radial arms 4 is of no importance and may be varied at will. In Figs. 4 and 5 I have shown the central member 8
65 as having a flat top or outer surface and having a corrugated or milled edge 9 so that it may be readily grasped by the fingers of the operator and easily manipulated.

It will be readily understood from the foregoing description, taken in connection 70 with the accompanying drawings, that my attachment provides a very convenient holder or handle whereby the needle apparatus may be raised from or lowered to the record and also forms a guard to protect
75 the mica and adjoining delicate parts from injury. Heretofore, so far as I am aware, when changing a record or raising or lowering the needle, it was necessary to take hold of the entire right side of the sound box
80 or else take hold of the goose neck or sound tube, either of which operations was clumsy and uncertain. By the use of my device, an unobstructed and clear view of the record
85 may be had so that the placing of the needle exactly where it should start may be accomplished with certainty. The operator's

hand will not obstruct the view and will not rub over the record and, consequently, will not injure the same. A very firm hold upon 90 the device may be obtained so that the liability of dropping the needle and attached parts upon the record is overcome. The sound box engaging fingers will be preferably constructed of resilient metal so that 95 they may be attached to and removed from the sound box without the use of any tools and may be finished in any desired manner so as to conform to the finish of the instrument and will, consequently, improve the 100 appearance of the instrument instead of marring the same. The tone or operation of the machine is not affected in any way by the application of the device since it will be seen that the arms of the device will support the handle member spaced from the diaphragm of the sound box with the space between the said handle member and the diaphragm open and unobstructed. Furthermore, it will be observed that the inner 110 extremities of the arms of the device incline away from the handle member toward the

periphery of the sound box to thus yieldably support the handle member upon the sound box and impart a certain give to the handle member when positioning the sound box to engage the needle with the phonograph record and consequently tend to prevent scratching of the record.

Having thus described the invention, what is claimed as new is:

1. A handle attachment for phonograph sound boxes including a handle knob, and coacting attaching arms rigidly secured to the said knob to extend outwardly and laterally therefrom at one side of the knob, the said arms confronting each other to define a sound box receiving space open and unobstructed between the arms at the said side of the handle knob and being adapted to embrace a sound box received within the said space for supporting the handle knob opposite the sound box diaphragm in spaced relation thereto with the space between the said knob and the diaphragm open and unobstructed.

2. A handle attachment for phonograph sound boxes including a handle knob, and a plurality of resilient attaching arms fixed to the said knob to incline at their inner extremities away from the knob at one side thereof and being thence directed laterally at their outer extremities to form sound box engaging terminals confronting each other with the space between the said arms at the said side of the knob open and unobstructed, the said arms being adapted to embrace a phonograph sound box with the laterally directed terminals of the arms engaging the periphery of the box at its inner

side and with the inclined inner extremities of the arm riding upon the periphery of the box at its outer side to yieldably support the handle knob opposite the sound box diaphragm in spaced relation thereto with the space between the said handle knob and the diaphragm open and unobstructed.

3. A handle attachment for flanged phonograph sound boxes including a handle knob, a plurality of attaching arms inclining away from the knob at one side thereof and formed with angularly disposed outer extremities, the said arms confronting each other with the space between the arms at the said side of the handle knob open and unobstructed, and outwardly extending hooks carried by the outer terminals of the said arms and opening at the inner sides thereof, the arms being adapted to embrace a phonograph sound box with the angularly disposed outer terminals thereof extending transversely of the width of the box to support the said hooks slidably engaged with the radial flange of the box at its inner side and with the inclined inner extremities of the said arms extending from the periphery of the box at its outer side to yieldably support the handle knob opposite the sound box diaphragm in spaced relation thereto with the space between the said knob and the diaphragm open and unobstructed and with the said hooks adapted to ride outwardly upon the said flange upon the inward movement of the said knob toward the diaphragm.

In testimony whereof I affix my signature.

HENRY FAUST, JR. [L. S.]

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

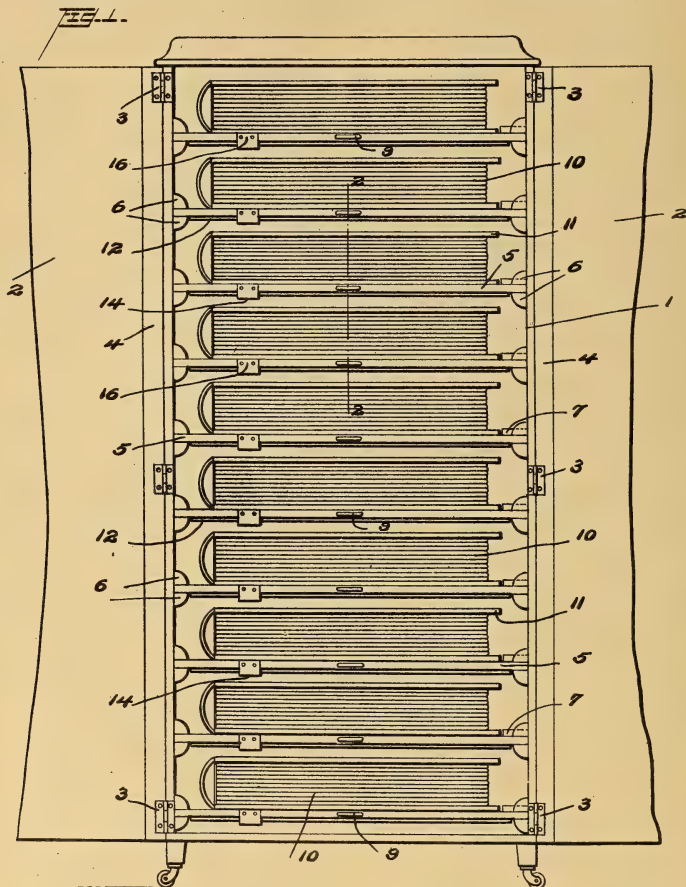
RECORD CABINET.

1,846,148 ----- H. B. Loos.
Patented Nov. 27, 1917.
Filed Jan. 19, 1917.

H. B. LOOS.
 RECORD CABINET.
 APPLICATION FILED JAN. 19, 1917.

1,248,142.

Patented Nov. 27, 1917.
 2 SHEETS—SHEET 1.



Witness

Harold, Strauss

By

Inventor
Henry B. Loos,

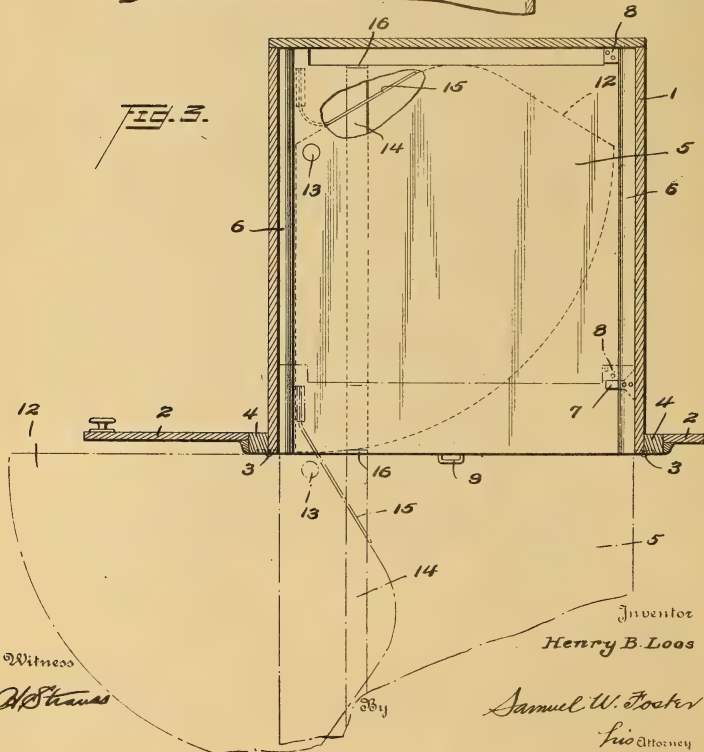
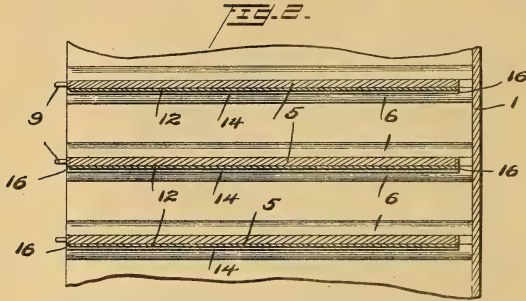
Samuel W. Foster
 his Attorney

H. B. LOOS.
RECORD CABINET.
APPLICATION FILED JAN. 19, 1917.

1,248,142.

Patented Nov. 27, 1917.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

HENRY B. LOOS, OF NARBERTH, PENNSYLVANIA.

RECORD-CABINET.

1,248,142.

Specification of Letters Patent.

Patented Nov. 27, 1917.

Application filed January 19, 1917. Serial No. 143,201.

To all whom it may concern:

Be it known that I, HENRY B. LOOS, a citizen of the United States, residing at Narberth, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Record-Cabinets, of which the following is a specification.

My invention relates to improvements in record cabinets, and more particularly to cabinets of the multiple shelf type, an object of the invention being to provide a cabinet for housing record books, each record book supported upon a sliding shelf, the latter having an extension which automatically moves to one side of the supporting shelf when the shelf is drawn outwardly, and provides ample supporting surface for the record book when the latter is opened.

A further object is to provide a cabinet of the character stated, having a sliding shelf, the latter supporting a pivoted extension which is spring-pressed, and which pivots laterally when the supporting shelf is moved outwardly, so that the supporting surface of the shelf is increased, and which pivoted extension moves under the sliding shelf when the latter is moved inwardly.

By reason of the construction above referred to, the shelves occupy but the minimum space in the cabinet, yet supply ample space for opening and supporting the books when the shelves are drawn outwardly, and the operation of the extensions is entirely automatic, being controlled by the sliding movement of the supporting shelf.

With these and other objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings:

Figure 1 is a view in front elevation, illustrating my improved record cabinet showing the doors opened and partly broken away.

Fig. 2 is a fragmentary view in vertical longitudinal section through the center of Fig. 1, as indicated by the line 2—2, the record books being omitted, and

Fig. 3 is a view taken in horizontal section through the cabinet, showing one of the shelves in full lines in its inward position, and in dotted lines in its outward or extended position.

1 represents a cabinet which may be of

any desired size and shape, and of any material or ornamentation desired. I have shown the cabinet provided with two doors 2—2, connected by hinges 3 with the sides of the cabinet, and it will be noted particularly by reference to Fig. 3, that the vertical posts 4 which ordinarily constitute a fixed part of the cabinet, are hinged to the cabinet and form a fixed part of the doors, so that when the doors are opened, the cabinet will have a full opening at its front without obstruction.

The cabinet 1 is provided with a vertical series of sliding shelves 5, and as all of these shelves are precisely alike, the description hereinafter of one will apply alike to all.

Each shelf 5 is mounted to slide between parallel guide strips 6—6 secured to the inner faces of the sides of the cabinet, and the outward movement of the shelf is limited by a stop 7 fixed to one of the strips 6, and located in the path of movement of a block 8 on the shelf, as shown clearly in Fig. 3.

Each shelf 5 is provided with a handle 9 at its forward edge to facilitate its movement, and each shelf is designed to support a record holding book 10. These books, as are well known in the art, are designed to support a number of record disks, and are provided with a cover 11, which when swung to open position, affords easy access to the disks.

In order that a full support may be provided for this cover and such disks as may be desired, I provide each shelf 5 with an extension 12. The extension 12 is in the form of a flat plate pivotally connected to the shelf by means of a rivet or other pivot 13, and adapted to swing laterally when the shelf is drawn outwardly.

A metal strip 14 is secured at its upturned ends 16 to the front and rear edges of the shelf 5, and is, throughout its intermediate portion, located below and parallel with the shelf 5, leaving sufficient space for the extension 12, permitting a free pivotal movement of the extension, yet supporting the same against downward movement.

A spring 15 is secured to the shelf 5, and bears against the rear edge of extension 12, tending to pivot the extension laterally, but when the shelf is in the cabinet this lateral movement is prevented by reason of the fact that the side edge of the extension bears against one of the guides 6.

When the shelf 5 is drawn to its outward position, the extension 12 is pivoted laterally to the position shown in dotted lines in Fig. 3, and provides ample support for the opened record book 10. Hence when the shelf is drawn outwardly, ample space is provided for the manipulation of the record books, and when the book is closed and the shelf moved inwardly, the extension 12 automatically swings into position under the shelf, and therefore the operator need only move the shelf 5 inwardly and outwardly, the extension 12 automatically moving from folded to extended position as will be readily understood.

It will be noted that the supporting strip 14 also acts as a guide for the free end of the spring 15, the spring being located between the strip 14 and the bottom face of shelf 5, and during its entire movement is between the strip and the shelf.

This is important because the extension is preferably, relatively thin, and there is a constant changing of surface engagement between the extension and the spring. The particular shape of extension shown, is in order to give the maximum of supporting surface thereto, and at the same time permit the extension to be housed under the shelf when the latter is in the cabinet.

While I have illustrated a particular form of cabinet, I would have it understood that I do not limit myself in this particular, but may vary the form of the cabinet, and use my improvements in connection with other structures, and I would also have it understood that I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

Having fully described my invention what I claim as new, and desire to secure by Letters Patent is:

1. A record cabinet comprising a support, a sliding shelf in the support, a laterally movable extension carried by the shelf and a spring forcing said extension to one side of the shelf when the latter is drawn outwardly.

2. A record cabinet comprising a support, a sliding shelf in the support, an extension pivotally connected to the shelf, and a

spring for moving the extension laterally when the shelf is drawn outwardly.

3. A record cabinet comprising a support, a sliding shelf in the support, a strip secured to the shelf and spaced from the lower face thereof, and an extension pivotally connected to the shelf and movable between the strip and the shelf.

4. A record cabinet comprising a support, a sliding shelf in the support, a strip secured to the shelf and spaced from the lower face thereof, an extension pivotally connected to the shelf and movable between the strip and the shelf, and a spring secured to the shelf and exerting pressure against the extension tending to force the extension laterally.

5. A record cabinet comprising a support, a sliding shelf in the support, a strip secured to the shelf and spaced from the lower face thereof, an extension pivotally connected to the shelf and movable between the strip and the shelf, a spring secured to the shelf, and at its free end guided between the strip and the shelf, said spring bearing against the edge of the extension, and tending to force the extension laterally.

6. A record cabinet comprising a casing having guides therein, a shelf mounted to slide in the guides, an extension pivotally connected to the shelf, a spring tending to force the extension laterally, said extension at one edge normally engaging one of the guides, and held by the guide against pivotal movement until the shelf is drawn outwardly.

7. A record cabinet comprising a casing having an open front and a closure therefor, a series of super-imposed sliding shelves in the casing movable through the open front thereof, and spring-pressed, laterally movable pivoted extensions carried by the shelves, and adapted when the shelves are drawn outwardly to move laterally relative to the shelves and provide an extended supporting surface for the articles on the shelves.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY B. LOOS.

Witnesses:

KATHRYN A. SUMMERS,
ELEANOR F. MURRAY.

AUTOMATIC STOPPING AND RELEASING MECHANISM FOR
PHONOGRAPHS.

1,248,533 ----- W. S. O'Brien,

Patented Dec. 4, 1917.

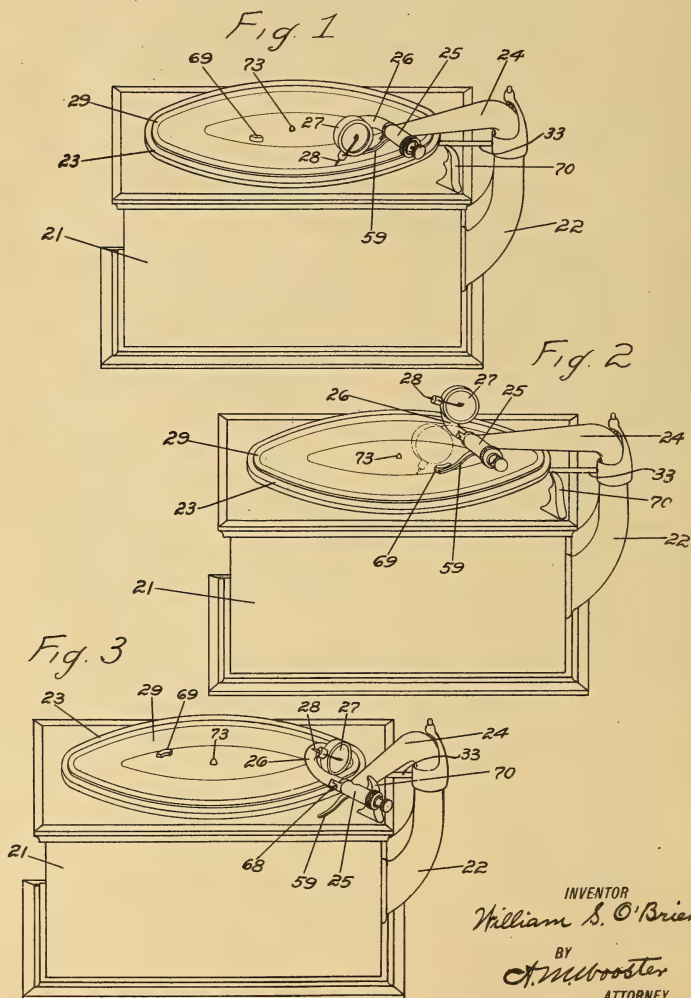
Filed April 17, 1917.

W. S. O'BRIEN.
 AUTOMATIC STOPPING AND RELEASING MECHANISM FOR PHONOGRAPHS.
 APPLICATION FILED APR. 17, 1917.

1,248,533.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 1.

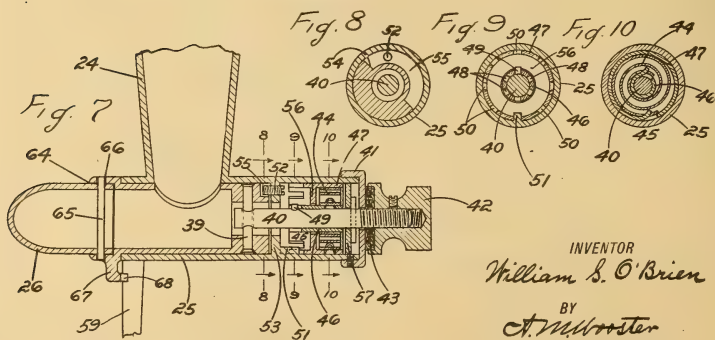
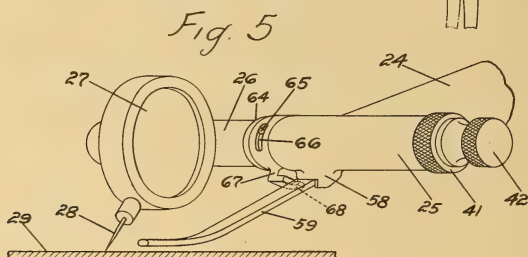
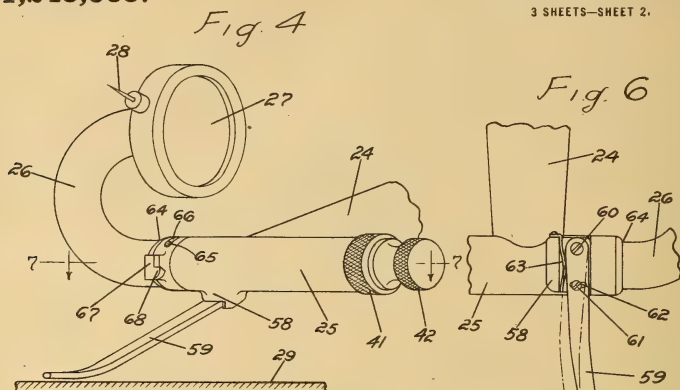


W. S. O'BRIEN.
 AUTOMATIC STOPPING AND RELEASING MECHANISM FOR PHONOGRAPHS.
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1,248,533.

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3 SHEETS—SHEET 2.



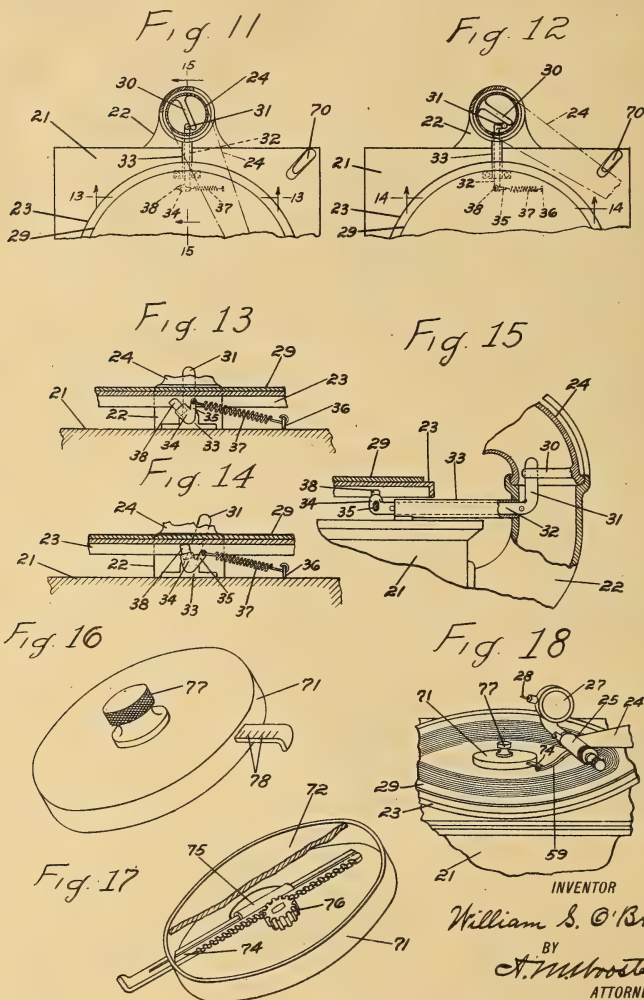
INVENTOR
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 ATTORNEY

W. S. O'BRIEN.
 AUTOMATIC STOPPING AND RELEASING MECHANISM FOR PHONOGRAPHS.
 APPLICATION FILED APR. 17, 1917.

1,248,533.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 3.



INVENTOR
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UNITED STATES PATENT OFFICE.

WILLIAM S. O'BRIEN, OF BRIDGEPORT, CONNECTICUT.

AUTOMATIC STOPPING AND RELEASING MECHANISM FOR PHONOGRAPHS.

1,248,533.

Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed April 17, 1917. Serial No. 162,740.

To all whom it may concern:

Be it known that I, WILLIAM S. O'BRIEN, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Automatic Stopping and Releasing Mechanism for Phonographs, of which the following is a specification.

This invention relates generally to phonographs, or so-called talking machines, with more particular reference to disk-record phonographs. For a long time, in connection with the use of machines of this character, it was necessary to anticipate the end of the rendition of a musical or other selection, in order that the stylus might be promptly withdrawn from the record-disk through the raising of the sound-box in order to prevent possible mutilation of the end of the record.

In order to avoid the annoyance and risk of this objectionable feature, mechanisms have been devised for automatically stopping rotation of the turn-table when the end of the record has been reached.

However, the mere provision of automatic braking mechanism for the turn-table does not accomplish all that might be desired, in view of the fact that the stylus-point remains pressed upon the record under the weight of the sound-box, under which conditions there still remains danger of mutilation of the record in manually withdrawing the sound-box or through the accidental starting of the machine.

The principal object of the present invention is the provision of mechanism in connection with a disk-record phonograph for automatically withdrawing the sound-box with its stylus from the record disk when the end of the record has been reached, irrespective of the length of the record, at the same time causing the tone-arm to swing back to its initial position and during such operation apply a suitable brake to stop rotation of the turn-table, leaving all of the parts in position for the replacement of a record and the "setting" of the tone-arm, sound-box and stylus for the rendition of a new selection, thereby automatically releasing the turn-table brake and permitting the same to start under action of a motor.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of a disk-

record phonograph embodying my invention, with the tone-arm and sound-box in starting position;

Fig. 2 is a similar view of the same, the tone-arm having been moved to the end of the record and the sound-box having been swung to its raised position;

Fig. 3 is a similar view of the same, with the tone-arm and sound-box returned to initial positions;

Fig. 4 is an enlarged perspective view of the end portion of the tone-arm, with the sound-box in raised position;

Fig. 5 is a similar view with the sound-box in operative position;

Fig. 6 is a fragmentary inverted plan view of the end portion of the tone-arm, showing the sound-box latching and releasing mechanism;

Fig. 7 is a horizontal section, taken substantially on the line 7—7 of Fig. 4;

Figs. 8, 9 and 10 are vertical sections, taken substantially on the lines 8—8, 9—9 and 10—10, respectively, of Fig. 7;

Figs. 11 and 12 are reduced fragmentary plan views of the machine, partly in section through the vertical portion of the tone-arm;

Fig. 13 is an enlarged section, taken substantially on the line 13—13 of Fig. 11;

Fig. 14 is an enlarged section, taken substantially on the line 14—14 of Fig. 12;

Fig. 15 is an enlarged section, taken substantially on the line 15—15 of Fig. 11;

Fig. 16 is a perspective view of a separate latch-tripping device adapted to be used with ordinary record-disks not especially equipped with the tripping lug shown in connection with the preferred construction;

Fig. 17 is a similar view of the same, inverted, with a portion of the bottom plate broken away, and

Fig. 18 is a fragmentary perspective view of the machine equipped with the auxiliary device shown in Figs. 16 and 17 and illustrating the application of the same.

Referring now to the drawings in detail, numeral 21 designates the case or cabinet of a phonograph or talking machine, equipped in the usual manner with the sound-amplifying compartment and motor (not shown), and with the exterior sound tube 22 and the turn-table 23 rotated in the usual manner from the motor. Swiveled in the upper end of the sound-tube 22, in the usual manner, is the tone-arm 24 carrying at its end the

transversely disposed sound-box tube 25 with its "goose-neck" 26 swiveled thereto in the usual manner, the sound-box 27 being mounted in the usual manner at the end of the goose-neck 26.

When the machine is out of use, the parts are in the positions indicated in Figs. 3 and 12, the sound-box 27 being in its raised position, where it is checked in the usual manner with stylus 28 clear of the record disk 29 on the turn-table, and the tone-arm 24 also swung clear of the record-disk to facilitate removal and re-placement of the same. Mounted in the interior of the vertical portion of the tone-arm 24, in substantially diametrical disposition, is the lever-arm 30 which is adapted to engage the transversely disposed arm 31 at the end of the rock-bar 32 journaled in the bearing-tube 33 suitably mounted upon the top of the cabinet 21. The other end of the rock-bar 32 projects underneath the edge of the turn-table, where it is provided with a head 34 which includes a lug 35 between which and a suitable anchorage on the top of the cabinet—such as the screw-eye 36—a spring 37 is tensioned, and a suitable seat or socket for the reception and retention of a small block 38 of material possessing a comparatively high co-efficient of friction—such as fiber, leather or the like—this block being adapted to impinge against the bottom face of the turn-table 23, when the bar 32 is permitted to oscillate under influence of the spring 37, and operate as a brake to check movement of said turn-table. When the parts are in the positions shown in Figs. 3 and 12, the block 38 has been brought by the spring 37 to braking position, and the arm 31 of the rock-bar 32 is in position to be immediately engaged by the lever-arm 30.

A disk-record having been properly positioned upon the turn-table, the sound-box 27 is now "set" in the usual manner by swinging the tone-arm 24 and lowering the sound-box 27 to such positions that the stylus 28 will register with the outer groove of the record. Obviously, this will cause the lever-arm 30 to actuate the arm 31 and oscillate the rock-bar 32 against the action of the spring 37 to depress the block 38 and release the turn-table 23, which at once starts to revolve under action of the motor. The process of sound reproduction is now carried out in precisely the same manner as in any common and well-known machine of this general character.

Projecting from the end of the goose-neck 26 within the sound-box tube 25, and preferably secured within a reduced portion of said goose-neck at this end thereof by means of the pin 39, is the shaft 40, which extends through a suitable aperture in the cap 41 screwed on the end of the sound-box tube 25, the end thereof being threaded for the re-

ception and retention of the thumb-nut 42. Between this thumb-nut 42 and the cap 41 is interposed a friction disk or washer 43 to yieldingly resist rotation of said shaft, and therefore of said goose-neck, within the tube 25, the degree of resistance being regulated by means of the thumb-nut 42 and being retained at a point insufficient to overcome the force of the coil-spring 44 mounted within the spring-cage 45. This spring-cage 45 comprises an inner tube 46 and an outer tube 47. The inner end of the inner tube 46 is provided with a series of notches 48 48, each adapted to be engaged by a pin 49 on the shaft 40, and the inner end of the outer tube 47 is similarly provided with a series of notches 50 50, each adapted to be engaged by a lug 51 on the inner face of the sound-box tube 25. The ends of the coil-spring 44 are secured, respectively, to the inner tube 46 and the outer tube 47 of the spring-cage, and it will be apparent that the tension of the spring may be regulated by varying the relative rotative positions of said spring-cage tubes by means of the selective arrangement of the notches 48 and 50. Under normal conditions, the tension of the spring 44 is sufficient to overcome the friction generated by the disk or washer 43, and throw the goose-neck 26 with the sound-box 27 to what I have termed raised positions, as shown in Fig. 4, but in a yielding and what may be termed a "cushioned" manner.

Movement of the goose-neck 26 under action of the spring 44 is checked, with the sound-box 27 in its raised position, by means of a pin 52 in a partition 53 in the sound-box tube 25, which engages a shoulder 54 at the end of a circular cut-out portion 55 in the end of the goose-neck 26. The outer tube 47 of the spring-cage may be provided with a partition 56 and the end of the sound-box tube 25 with an apertured washer 57 in order to completely incase or inclose the spring 44.

Upon the lower side of the sound-box tube 25, I provide a boss 58, grooved for the reception of the lever-arm 59 which is pivoted at 60 and forms what might be termed an extension of the tone-arm 24. This lever-arm 59 has a slight oscillatory movement about the pivot 60 which is limited by the screw-pin 61 in the slot 62. A leaf-spring 63 secured to one side of the boss 58 yieldingly retains the lever-arm 59 in one position of oscillation, as and for a purpose hereinafter explained. In order to simplify description, I have hereinbefore referred to the goose-neck 26 as an entity. As a matter of fact, in the machine of my invention, it should comprise two parts having a swivel connection at 64, whereby the curved portion thereof has a slight freedom of rotary movement relative to the straight portion thereof. This may be accomplished as in-

indicated in Fig. 7 by telescoping these parts and mounting in the inner part a pin 65 which passes completely through the same and projects on both sides into suitable slots 5 66 in the outer part, thus also limiting relative rotation of said parts to a comparatively small arc. At the end of the straight portion of the goose-neck 26 I provide a lug 67 which has a catch or shoulder 68 adapted to pass under and engage the lever-arm 59 when the goose-neck 26 has been sufficiently depressed. These parts are so relatively positioned that when the lever-arm 59 has been engaged by the catch 68, the 10 curved portion of the goose-neck 26 is still downwardly rotatable through a slight arc, so that the stylus point is properly retained in the record groove by the weight of the sound-box 27 in the usual manner. It will 20 be seen, therefore, that in starting the machine the sound-box may be grasped in the usual manner, the tone-arm swung to approximately proper position, the sound-box depressed until the catch 68 engages the arm 25 59, and the stylus point adjusted in the outer groove of the record, whereupon—the brake having been released by these operations—the selection of the record will be rendered in the usual manner.

30 In connection with a device embodying my invention, I prefer to employ a specially prepared record disk—this disk being provided with an upwardly-projecting lug 69 (Figs. 1, 2 and 3) formed upon the same in 35 any desired manner when the disk is made and so positioned as to engage the end of the arm 59 when the end of the record is reached. Obviously, this engagement will effect movement of the arm 59 against the 40 action of the spring 63 to release the catch 68, whereupon—under action of the spring 44—the goose-neck 26 will be rotated to raise the sound-box 27 to the position indicated in Fig. 4, clear of the record disk. 45 In the meantime, movement of the tone-arm 24 has stored energy in the spring 37, and upon release of the stylus point this spring operates to rock the bar 32 and through engagement between the arms 30 and 31 re- 50 turn the tone-arm 24 to initial position—in which position movement thereof is checked by a suitable stop 70—and at the same time raise the block 38 to contact with the lower face of the turn-table 23 where it operates 55 as a brake to stop movement of said turn-table.

Any ordinary and standard disk-record of commerce may be used in connection with the machine of my invention through the 60 employment of an auxiliary or supplemental device such as that shown in Figs. 16, 17 and 18. This auxiliary or supplemental device comprises a shallow cylindrical housing 71 the lower plate 72 of which is centrally 65 apertured for the reception of the usual

projecting end 73 of the turn-table shaft, so that the housing or casing will lie flat upon the record-disk in concentric position and be retained in such position. Within this housing is mounted the ratchet-bar 74 70 having slide bearings in the bracket 75 and adapted to be reciprocated longitudinally by means of the pinion 76 which has suitable connection with the thumb-nut 77, exterior of the casing or housing, whereby 75 said pinion may be turned to reciprocate said ratchet-bar 74. The exterior end of the bar 74 is preferably bent to provide a head adapted to engage the arm 59 in a manner precisely similar to the manner in 80 which the latter is engaged by the lug 69 on the disk-record 29 in the preferred construction, thus tripping said arm and causing the raising of the sound-box and rearward swinging of the tone-arm in the man- 85 ner heretofore described.

In using this auxiliary or supplemental device, of course, either the record-disk must be originally marked with a figure or figures indicating the distance of the end of the 90 record from the center of the disk, or this distance must be determined by the purchaser or user of the record and noted thereon, and I have shown the ratchet-bar 74 provided with a scale 78 graduated to corre- 95 spond with these varying distances, whereby by turning the thumb-nut 77 the bar 74 may be properly "set" to trip the arm 59 at the end of the record. Furthermore, employment of this auxiliary or supplemental 100 device enables the operator of the machine to stop the rendition of a selection short of the end thereof and at substantially any desired point therein—always insuring the raising of the sound-box, swinging of the 105 tone-arm to initial position, and braking the turn-table.

Many modifications of my improved controlling mechanism for phonographs will doubtless readily suggest themselves to those 110 skilled in the art to which the improvements appertain, and I therefore do not desire to limit my invention to the specific constructions herein shown and described.

I claim as new and desire to secure by 115 Letters Patent:

1. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, and a sound-box mounted at the 120 end of said tone-arm to swing vertically between operative and inoperative positions, of means for yieldingly pressing said tone-arm in a direction away from the center of said turn-table, a stop for checking move- 125 ment of said tone-arm under action of said pressing means, means for yieldingly pressing said sound-box to inoperative position, means for retaining said sound-box in operative position under action of its pressing 130

means, and means for releasing said retaining means at a predetermined point in the path of movement of said tone-arm, whereby said sound-box is swung to inoperative position and said tone-arm to engagement with said stop.

2. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of means for yieldingly pressing said tone-arm in a direction away from the center of said turn-table, means interposed in said pressing means for braking said turn-table at a predetermined point in the path of movement of said tone-arm, a stop for checking movement of said tone-arm under action of said pressing means, means for yieldingly pressing said sound-box to inoperative position, means for retaining said sound-box in operative position under action of its pressing means, and means for releasing said retaining means at a predetermined point in the path of movement of said tone-arm, whereby said sound-box is swung to inoperative position and said tone-arm to engagement with said stop.

3. In a disk-record phonograph, the combination, with the driven turn-table a tone-arm swiveled to swing horizontally over said turntable, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of means for yieldingly pressing said tone-arm in a direction away from the center of said turn-table, a stop for checking movement of said tone-arm under action of said pressing means, means for yieldingly pressing said sound-box to inoperative position, means for checking said last-mentioned pressing means with said sound-box in operative position, said sound-box being mounted for slight swinging movement independent of said checking means whereby it is supported through the stylus therein upon the record on said turn-table under action of gravity, and means for releasing said checking means at a predetermined point in the path of movement of said tone-arm toward the center of said turn-table, whereby said sound-box is swung to inoperative position and said tone-arm to engagement with said stop.

4. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of means for yieldingly pressing said tone-arm in a direction away from the center of said turn-table, means interposed in said

pressing means for braking said turn-table at a predetermined point in the path of movement of said tone-arm, a stop for checking movement of said tone-arm under action of said pressing means, means for yieldingly pressing said sound-box to inoperative position, means for checking said last-mentioned pressing means with said sound-box in operative position, said sound-box being mounted for slight vertical movement independent of said checking means whereby it is supported through the stylus therein upon the record on said turn-table under action of gravity, and means for releasing said checking means at a predetermined point in the path of movement of said tone-arm toward the center of said turn-table, whereby said sound-box is swung to inoperative position and said tone-arm to engagement with said stop.

5. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of means for yieldingly pressing said sound-box to inoperative position, means for retaining said sound-box in operative position under action of said pressing means, and means for releasing said retaining means at a predetermined point in the path of movement of said tone-arm whereby said sound-box is automatically swung to inoperative position at said point.

6. In a disk-record phonograph, the combination, with the driven turn-table, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of means for yieldingly pressing said sound-box in inoperative position, means for checking said pressing means with said sound-box in operative position, said sound-box being mounted for slight swinging movement independent of said checking means whereby it is supported through the stylus therein upon the record on said turn-table under action of gravity, and means for releasing said checking means at a predetermined point in the path of movement of said tone-arm toward the center of the turn-table, whereby said sound-box is automatically swung to inoperative position at said point.

7. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of a rock-bar, a spring mounted to rock said bar in one direction, a crank-arm on said bar, a lever-arm associated with said tone-arm and adapted to engage said crank-arm

upon movement of said tone-arm toward the center of the turn-table and thereby rock said bar against the action of said spring, and a brake-shoe mounted on said rock-bar and adapted to impinge against said turn-table at a certain point in the path of movement of said rock-bar under action of its spring.

8. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, a sound-box arm mounted at the end of said tone-arm, said sound-box arm including a straight portion and a curved portion swiveled therein, and a sound-box at the end of said curved portion, of a spring interposed between said straight and curved portions to yieldingly oscillate said curved portion in one direction, means for checking said curved portion against movement under action of said spring, and means for releasing said checking means at a predetermined point in the path of movement of said tone-arm toward the center of said turn-table.

9. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, a sound-box arm mounted at the end of said tone-arm, said sound-box arm including a straight portion and a curved portion swiveled therein, and a sound-box at the end of said curved portion, of a spring interposed between said straight and curved portions to yieldingly oscillate said curved portion in one direction, means for checking said curved portion against movement under action of said spring, means for releasing said checking means at a predetermined point in the path of movement of said tone-arm toward the center of said turn-table, a rock-bar, a spring mounted to rock said bar in one direction, a crank-arm on said bar, and a lever-arm associated with said tone-arm and adapted to engage said crank-arm upon movement of said tone-arm toward the center of the turn-table and thereby rock said bar against the action of said spring.

ter of the turn-table and thereby rock said bar against the action of said spring.

10. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, and a sound-box mounted at the end of said tone-arm to swing vertically between operative and inoperative positions, of a rock-bar, a spring mounted to rock said bar in one direction, a crank-arm on said bar, and a lever-arm associated with said tone-arm and adapted to engage said crank-arm upon movement of said tone-arm toward the center of the turn-table and thereby rock said bar against the action of said spring.

11. In a disk-record phonograph, the combination, with the driven turn-table, a tone-arm swiveled to swing horizontally over said turn-table, a sound-box arm mounted at the end of said tone-arm, said sound-box arm including a straight portion and a curved portion swiveled therein, and a sound-box at the end of said curved portion, of a spring interposed between said straight and curved portions to yieldingly oscillate said curved portion in one direction, means for checking said curved portion against movement under action of said spring, means for releasing said checking means at a predetermined point in the path of movement of said tone-arm toward the center of said turn-table, a rock-bar, a spring mounted to rock said bar in one direction, a crank-arm on said bar, a lever-arm associated with said tone-arm and adapted to engage said crank-arm upon movement of said tone-arm toward the center of the turn-table and thereby rock said bar against the action of said spring, and a brake-shoe mounted on said rock-bar and adapted to impinge against said turn-table at a certain point in the path of movement of said rock-bar under action of its spring.

In testimony whereof I affix my signature.
WILLIAM S. O'BRIEN.

ROLLING PHONOGRAPH RECORDS.

1,248,541 ----- B. F. Philpot,
Patented Dec. 4, 1917.
Filed Jan. 3, 1913.

B. F. PHILPOT.
MOLDING PHONOGRAPH RECORDS.
APPLICATION FILED JAN. 3, 1913.

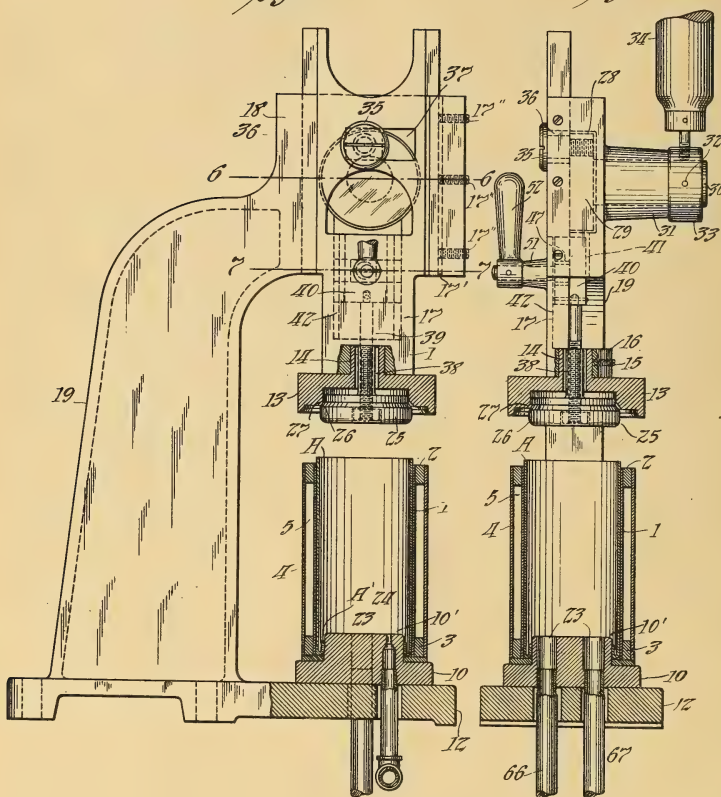
1,248,541.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 1.

Fig. 1

Fig. 2



Witnesses:

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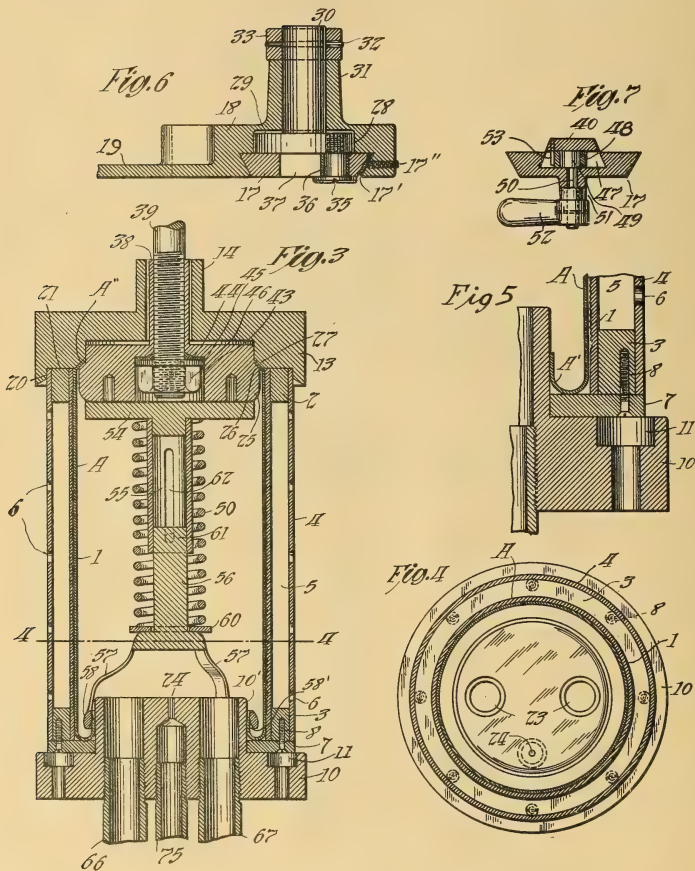
Inventor:

Brian F. Philpot
by Ryer & Holden
his Atty.

B. F. PHILPOT.
MOLDING PHONOGRAPH RECORDS.
APPLICATION FILED JAN. 3, 1913.

1,248,541.

Patented Dec. 4, 1917.
3 SHEETS—SHEET 2.



Witnesses:

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by Dyer & Holden
His Attys.



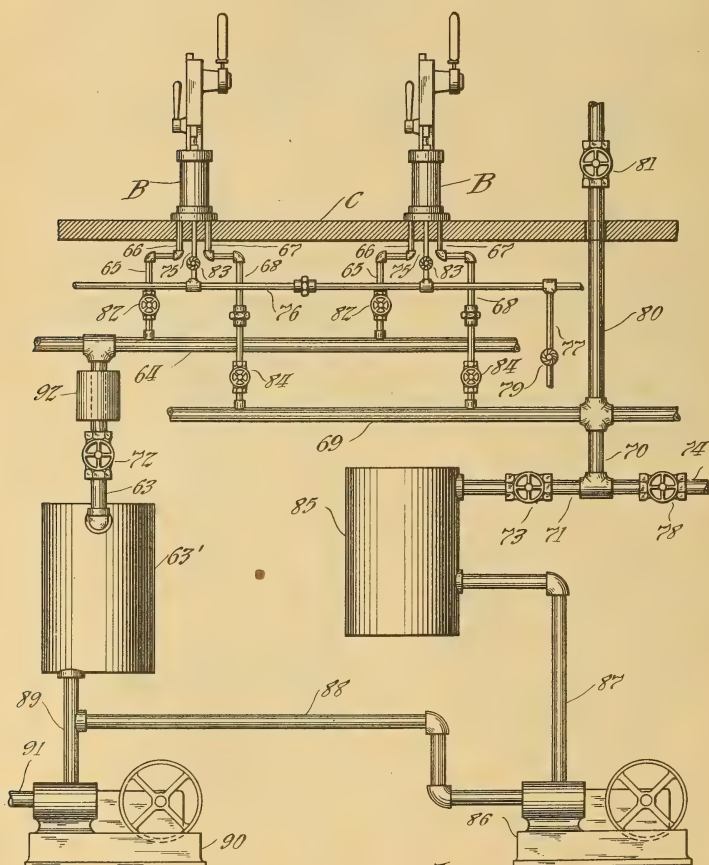
B. F. PHILPOT,
MOLDING PHONOGRAPH RECORDS.
APPLICATION FILED JAN. 3, 1913.

1,248,541.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 3.

Fig. 8



Witnesses:

W. E. Brown
Frederick Packman

Inventor:

Brewer F. Philpot

by Dyer & Holden
his Atty.

UNITED STATES PATENT OFFICE.

BRIAN F. PHILPOT, OF ORANGE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MOLDING PHONOGRAPH-RECORDS.

1,248,541.

Specification of Letters Patent.

Patented Dec. 4, 1917.

Application filed January 3, 1913. Serial No. 739,975.

To all whom it may concern:

Be it known that I, BRIAN F. PHILPOT, a citizen of the United States, and a resident of Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Invention in Molding Phonograph-Records, of which the following is a description.

This invention relates to the molding of phonograph records, and more particularly to apparatus and a process for the production of records by the introduction of fluid under pressure to the interior of a thin cylinder of celluloid or similar material to force the same into the indentations of a surrounding matrix or mold. The principal object of the invention is to provide improved apparatus and an improved process of this character, the invention residing in the construction and combination of parts and in the processes and sub-processes hereinafter more fully described and claimed.

In order that my invention may be more clearly understood, attention is hereby directed to the accompanying drawing in which—

Figure 1 represents a side elevation partly in section of a part of my improved apparatus;

Fig. 2 represents a front elevation partly in section of the apparatus shown in Fig. 1;

Fig. 3 represents an enlarged central vertical sectional view of a portion of the apparatus disclosed in Fig. 1, together with my improved form of clamping means for insuring a fluid tight joint between the lower portion of the record cylinder and the mold;

Fig. 4 represents a section taken on the line 4—4 of Fig. 3, the clamping means above referred to being omitted;

Fig. 5 represents an enlarged vertical sectional view of a portion of the apparatus shown in Fig. 3;

Fig. 6 represents a sectional view taken on the line 6—6 of Fig. 1 and showing a detail of construction;

Fig. 7 represents a sectional view taken on the line 7—7 of Fig. 1 and showing another detail of construction; and

Fig. 8 represents a front elevation illustrating a system for controlling the circula-

tion of fluid through the interior of the molds.

In all the views, like parts are designated by the same reference numerals.

Referring to the drawing, the numeral 1 designates a matrix preferably made by electrodeposition upon a wax-like master record in a manner well known in the art. Secured to the opposite ends of the matrix 1 are metallic rings 2 and 3 to the outer surfaces of which is secured a thin metallic sleeve 4, an air space 5 being thus provided between the said matrix and sleeve. The sleeve 4 is provided with a suitable number of spaced openings or vents 6 leading into the air space 5 whereby a circulation of air through the space is permitted and excessive heating of the matrix 1 avoided. Rings 2 and 3 and sleeve 4 form a very strong yet light backing for the matrix 1. To the bottom of the ring 3 an annular member 7 is secured, as by means of screws 8 (see Figs. 3 and 5), the said member projecting inwardly beyond the record surface of the matrix so as to form a support for the lower end of the record cylinder A. The numeral 10 designates a base for supporting a mold such as that described above, this base being provided with a cylindrical upwardly extending projection 10' against the cylindrical lateral surface of which the member 7 and the flanged end portion A' of the record cylinder fit closely. The base 10 is provided with countersunk openings 11 adapted to receive screws or other suitable headed members to secure the base to a bed plate 12. A head or cap 13 serves to close the top of the mold during the molding operation, this head being provided with a central tubular extension 14 secured, as by a screw or screws 15, within a vertical opening in the offset 16 formed at the lower part of a slide 17 which is adapted to reciprocate vertically in the forwardly extending portion 18 of a standard 19 integral with the plate 12. As shown in Figs. 1 and 6, the slide 17 has a dovetailed connection with the part 18. A gib or wearing plate 17' is placed between one edge of the slide and the adjacent edge of the part 18 and is adjustable more or less firmly in engagement with the slide 17 by screws 17'' threaded into the part 18. The

cap or head 13 is provided with surfaces 20 and 21 adapted to bear against the periphery and the top of the mold. The base 10 is provided with two large openings 23 and a small opening 24, these openings serving for the admission and exhaust of the steam and air used in molding, as will be hereinafter explained. For sealing the upper end of the record cylinder to prevent the escape of fluid from the interior thereof during the molding operation, the head or cap 13 is provided with a member 25 adapted to be adjusted, by means hereinafter described, to clamp the upper end of the record cylinder between the same and the body of the head or cap 13. The clamping surface 26 on the member 25 and the coating surface 27 on the body of the head or cap 13 are substantially conical as shown and are inclined upwardly and inwardly so that when the head or cap is lowered the upper end of the record cylinder A is forced between the surfaces 26 and 27 and is thereby formed with a flange as shown at A'.

To provide means for moving the slide 17 and the parts carried thereby into desired vertical position, the portion 18 of the standard is formed with a recess 28 in the rear of the slide 17, in which recess a circular disk 29 is rotatably mounted, as by a central cylindrical projection 30 formed on the said disk and extending through a tubular boss or projection 31 on the part 18. Secured to the outer end of the projection 30, as by a pin 32, is a collar 33, which bears against the outer end of the boss 31 and has secured thereto an arm or lever 34 by which the disk 29 may be readily rotated in its support. Pivoted on the disk 29, as by means of the headed screw 35, is a block 36, this block being slidable in a horizontal slot 37 formed in the slide 17. The pivot 35 is located eccentrically with respect to the axis of rotation of the disk 29 so that by rotating said disk by means of the arm 34, the slide 17 may be reciprocated vertically. The construction is such that when the head or cap 13 is in engagement with the top of the mold, the axis of the pivot screw 35 and the axis of rotation of the disk 29 will lie substantially in the same vertical plane and pressure of the fluid in the mold on the member 26 cannot lift the head from the mold.

For supporting the part 25 and adjusting the same with respect to the head or cap 13, I preferably provide the member 25 with a central tubular projection 38 movable up and down in a central vertical opening through the cap 13 and threaded on to the lower end of a rod 39, which is secured at its upper end to a block 40 adapted to reciprocate vertically in a recess 41 in the part 18 and a recess 42 in the slide 17. The member 25 is provided with a central recess 43 adapted to receive the lower end of the rod

39, and the packing washer 44, metallic washer 45, and nut 46 mounted on the lower end of the said rod. The washer 44 is located at the bottom of the recess and is adapted to be forced by the nut 46 into intimate engagement with the member 25 and the rod 39 to produce a fluid tight joint between these parts. The block 40 has a dovetailed connection with the slide 17, as clearly shown in Fig. 7, and is provided with a horizontal recess 47 in which a block 48 is slidably mounted. A cylindrical head or disk 49 eccentrically mounted on a rod 50 is rotatable within the block 48, the rod 50 extending through a tubular extension 51 on the slide 17 and having secured to the outer end thereof an arm or lever 52 whereby the said rod and the disk 49 may be rotated to oscillate the block 48 in the slot 47 and to raise and lower the block 40 and the member 25 with respect to the slide 17. A pin 53 secured to the block 40 limits the movement of the block 48 to the left, as shown in Fig. 7, and thereby limits the downward movement of the member 25 with respect to the head or cap 13.

To insure a fluid tight connection between the lower end of the record cylinder and the mold, I employ clamping means comprising a flat member 54 adapted to bear against the lower face of the member 25 and having a tubular extension 55 secured thereto, and a member 56 slidable within the extension 55 and provided at its lower end with inclined outwardly extending arms 57 connected at their lower ends with a circular ring 58. The inner diameter of the ring 58 should be slightly greater than the outer diameter of the projection 10' so as to be movable over the same, but it should be slightly smaller in diameter than the flange A' on the lower end of the record cylinder.

The inner surface of the said ring should taper as shown at 58', Fig. 3, so as to be capable of wedging the flange A' closely against the projection 10' when the ring is pressed downward by the action of the spring 50 bearing against the under surface of the part 54 and a washer or ring 60 supported on a shoulder on the part 56. A pin 61 secured in the part 56 and slidable in a slot 62 in the extension 55 prevents relative rotation between the part 56 and the extension 55.

Referring more particularly to Fig. 8, a plurality of molding appliances like those hereinbefore described are shown at B, B supported upon a suitable table or other support C. While only two of these appliances are shown, any desired number of the same may obviously be employed. The numeral 63 designates an inlet or supply pipe for air used in the molding operation, this pipe leading from an air reservoir or tank 63' and being connected with a horizontal pipe 64 running under the mold-

ing appliances B, B and connected with the latter by suitable pipe connections 65, one of these connections 65 communicating with the interior of each of the molds through a pipe 66 threaded into one of the openings 23 in the mold, as shown in Figs. 2 and 3. A pipe 67 is threaded into each of the other openings 23, and connections 68 lead from each of the pipes 67 to a horizontal pipe 69 communicating with a vertical pipe 70 from which leads a horizontal extension 71 serving as an outlet for the air leaving the molding apparatus. Valves 72 and 73 are provided in the pipes 63 and 71 respectively to control the circulation of air through the molding apparatus. The pipe 70 has connected thereto a pipe 74 by which steam may be admitted thereto, the steam passing from the pipe 70 through the pipe 69 then through the various connections 68 to the molds from which it is exhausted through the pipes 75 threaded into the openings 24 in the base plates 10 and communicating with a horizontal outlet pipe 76 which is provided with a vertical extension 77 from which the exhaust steam is permitted to escape. Valves 78 and 79 are placed in the pipes 74 and 77 respectively to permit the control of the circulation of steam through the molding apparatus. A pressure exhaust pipe 80 leads from the pipes 69 and 70 and is provided with a valve 81, the pressure exhaust serving to permit air or other fluid under pressure in the molds to escape to the atmosphere. The pipe connections 65, 75 and 68 are provided with valves 82, 83 and 84 respectively whereby any particular molding appliance B can be shut off from the fluid supply system without preventing the operation of the other molds in the system hereinbefore described. The air from the pipe 71 is preferably led into a reservoir or tank 85 from which it may be returned by a compressor or pump 86 and the pipe connections 87, 88 and 89 to the supply tank 63'. An air compressor 90 having an intake 91 from the atmosphere serves to supply tank 63' through pipe 89 with sufficient air to make up any loss and to keep the air pressure in tank 63' constant. For efficient action, the air pressure in the circulating system described above should be comparatively high, the pressure in tank 63' being preferably about 100 lbs. per square inch and that in the tank 85 about 10 lbs. per square inch less, or about 90 lbs. per square inch. A water jacket 92 is placed around a pipe 63 to cool the air passing through the same.

In operation, a cylindrical record blank or tablet A formed with an inwardly directed flange A' adapted to fit closely around the part 10' is placed in position in each of the molds, as shown in Figs. 1 and 2, the upper cylindrical end of the blank extend-

ing vertically upward a short distance above the top of the mold. One of the clamps shown in Fig. 3 is then placed in position in each mold after which the molds are placed on the bases 10 around the projections 10'. The heads or caps 13 are then lowered upon the molds by operating the arms 34, the upper ends of the record cylinders or blanks being forced by this operation between the inclined surfaces 26 and 27 of the members 25 and the heads or caps 13, the flanges A' being at the same time wedged firmly against the projections 10' by the spring pressed ring 58. After this the members 25 are drawn upwardly by operating the arms 52 until the upper ends of the record cylinders or blanks are firmly clamped between the surfaces 26 and 27, as shown in Fig. 3, the record cylinders being now formed at their upper ends with the inwardly directed flanges A".

During the above operations, all of the valves except valves 81, 82, 83 and 84 are closed. The next step consists in closing the valve 81 and opening the valves 78 and 79 to permit steam under pressure to circulate through the fluid tight chambers formed within the record cylinders so as to soften the said cylinders and force the same into the indentations in the matrices. This step also causes the flanges at the ends of the record cylinders to be forced into intimate contact with the adjacent surfaces of the mold and thereby to be given their final shape. After a suitable time has elapsed to permit the record cylinders to be thus molded, the valves 78 and 79 are closed and the valves 72 and 73 opened. Air is now circulated under pressure through the chambers within the record cylinders and the said cylinders are thereby cooled while held firmly in engagement with the indentations of the matrices. The air is passed through the molds a sufficient length of time to permit the record cylinders to become set after which the valves 72 and 73 are closed and the pressure in the molding apparatus relieved by opening the valve 81 and permitting the air in the said apparatus to escape to the atmosphere. The molds may now be opened by the operation of the arms 52 and 34 and the finished record cylinders removed from the molds. If, during the molding operation any particular molding appliance B should leak or become otherwise defective, this particular appliance may be shut off from the system by closing the valves 82, 83 and 84, the other appliances in the same system being operable as usual.

It is obvious that numerous changes may be made in the invention as herein disclosed without departing from the spirit of my invention, and I wish, therefore, not to be limited to the exact details shown and described.

What I claim as new and desire to protect by Letters Patent of the United States is as follows:

1. In apparatus of the class described,
5 the combination with a cylindrical matrix, of a base for closing one end of a record cylinder placed within said matrix, and a cap for closing the other end of the record cylinder, said cap being provided with a clamp for securing the adjacent end of the
10 record cylinder to the cap and also producing a fluid tight connection between the record cylinder and the cap, said cap being also provided with a portion cooperating
15 with said clamp to form a flange on the end of the record cylinder, substantially as described.
2. In apparatus of the class described,
20 the combination of means for supporting a record cylinder, and a head movable axially of said means and provided with means between which an end of a record cylinder supported by said first named
25 means is adapted to be forced on the movement of the head in one direction to form a flange on the said cylinder, substantially as described.
3. In apparatus of the class described,
30 the combination of means for supporting a record cylinder, and a head movable axially of said means and provided with opposed surfaces inclined to the direction of movement of the head and between
35 which an end of a record cylinder supported by said means is adapted to be forced on the movement of the head in one direction to form a flange on the record cylinder, substantially as described.
4. In apparatus of the class described,
40 the combination of means for supporting a record cylinder, and a head movable axially of said means and comprising members having opposed surfaces inclined to the direction of movement of the head and between
45 which an end of a record cylinder supported by said means is adapted to be forced on the movement of the head in one direction to form a flange on the record cylinder, one of said members being movable with respect to the other to permit
50 said flange to be clamped between said surfaces, substantially as described.
5. In apparatus of the class described,
55 the combination of means for supporting a sound record mold, a cap for said mold, and manually operable means for moving said cap toward and for positively moving the same away from said first named means, substantially as described.
6. In apparatus of the class described,
60 the combination of a sound record mold, means for supporting the same, a cap for closing one end of said mold, and manually operable means comprising a rotatable member eccentrically connected to said cap
65 for moving the latter relatively to said mold, said manually operable means being arranged to prevent movement of said cap by the application of pressure directly to the latter when the same is in operative
70 position with respect to the mold, substantially as described.
7. In apparatus of the class described,
75 the combination of means for supporting a sound record mold, a cap for said mold, a slide supporting said cap, a support for said slide, and manually operable means comprising a rotatable member eccentrically connected to said slide for shifting
80 the latter to move said cap toward and away from said first named means, substantially as described.
8. In apparatus of the class described,
85 the combination of a mold, means for supporting the same, a cap for said mold, a slide supporting said cap, a support for said slide, and means comprising a rotatable member eccentrically and pivotally connected to said slide for shifting the latter to move said cap toward and away from said
90 mold, the axes of said rotatable member and of the pivotal connection between said member and said slide being located in a line coinciding substantially with the direction of movement of said slide in its
95 port when the cap is in operative position with respect to the mold, substantially as described.
9. In apparatus of the class described, the combination of means for supporting a
100 sound record mold, a cap for said mold, a slide supporting said cap and having a transverse slot therein, and means comprising a rotatable member and a member mounted eccentrically on said rotatable
105 member and slidable in said slot for shifting said slide to move said cap toward and away from said first named means, substantially as described.
10. In apparatus of the class described,
110 the combination of means for supporting a sound record mold, a cap for said mold, a slide supporting said cap, and means comprising a rotatable member and a member mounted eccentrically on said rotatable
115 member and having a slidable connection with said slide, whereby said slide may be shifted to move said cap toward and away from said first named means, substantially as described.
11. As a new article of manufacture, a sound record mold comprising a matrix,
120 members secured to the rear surface thereof, and a backing secured to the outer surface of said members and forming a hollow air space in back of said matrix, substantially as described.
12. As a new article of manufacture, a sound record mold comprising a matrix,
125 members secured to the rear surface thereof,

and a backing secured to the outer surface of said members and forming a hollow air space in back of said matrix, said backing being provided with openings or vents to permit circulation of air through said space, substantially as described.

13. As a new article of manufacture, a sound record mold comprising a matrix, spaced rings secured to the rear surface thereof, and a covering secured to the outer surface of said rings and spaced from said matrix, substantially as described.

14. As a new article of manufacture, a sound record mold comprising a cylindrical matrix, spaced rings secured to the rear surface thereof and a sleeve secured to the outer surface of said rings and spaced from said matrix, substantially as described.

15. As a new article of manufacture, a sound record mold comprising a cylindrical matrix, spaced rings secured to the rear surface thereof and a sleeve secured to the outer surface of said rings and spaced from

said matrix, said sleeve being provided with openings or vents to permit circulation of air through the space between the sleeve and matrix, substantially as described.

16. In apparatus of the class described, the combination of a mold, and means whereby a given body of fluid may be circulated through said mold a plurality of times, substantially as described.

17. In apparatus of the class described, the combination of a mold, means whereby a given body of fluid may be circulated through said mold a plurality of times, and means for cooling said fluid prior to each passage thereof through said mold, substantially as described.

This specification signed and witnessed this 2nd day of January 1913.

BRIAN F. PHILPOT.

Witnesses:

FREDERICK BACHMANN,
MARY J. LAIDLAW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH AND THE LIKE.

1,248,757 ----- H.B. Tremaine & E.S. Votey.
Patented Dec. 4, 1917.
Filed Jan. 23, 1915.

H. B. TREMAINE & E. S. VOTEY,
 PHONOGRAPH AND THE LIKE.
 APPLICATION FILED JAN. 23, 1915.

1,248,757.

Patented Dec. 4, 1917.
 2 SHEETS—SHEET 1.

Fig. 1.

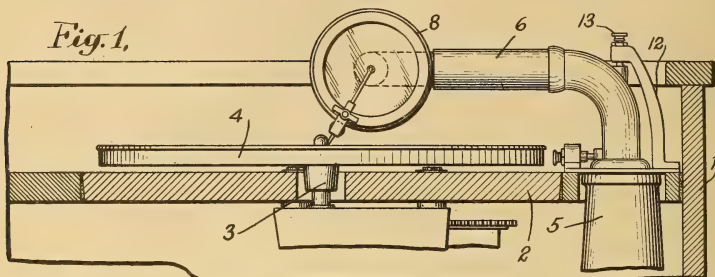
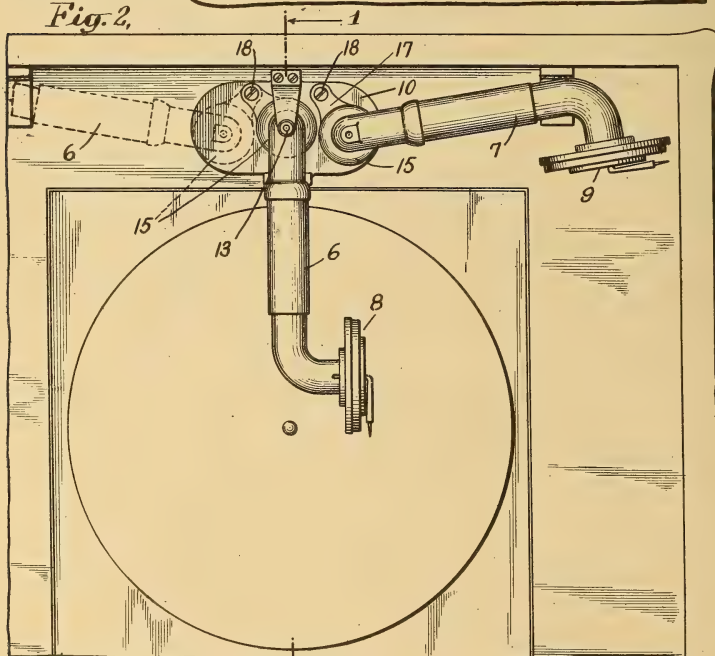


Fig. 2.



WITNESSES:

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INVENTOR'S

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H. B. TREMAINE & E. S. VOTEY.
 PHONOGRAPH AND THE LIKE.
 APPLICATION FILED JAN. 23, 1915.

1,248,757.

Patented Dec. 4, 1917.

2 SHEETS—SHEET 2.

Fig. 3,

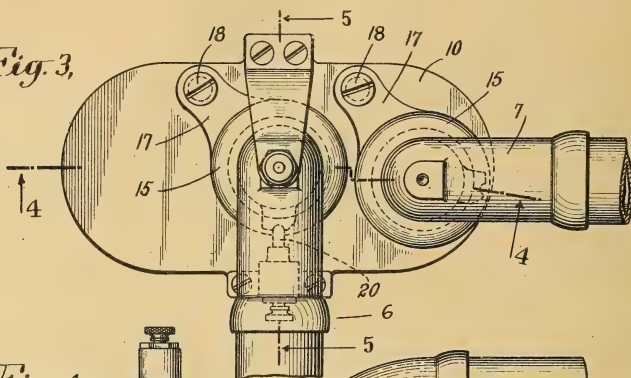


Fig. 4,

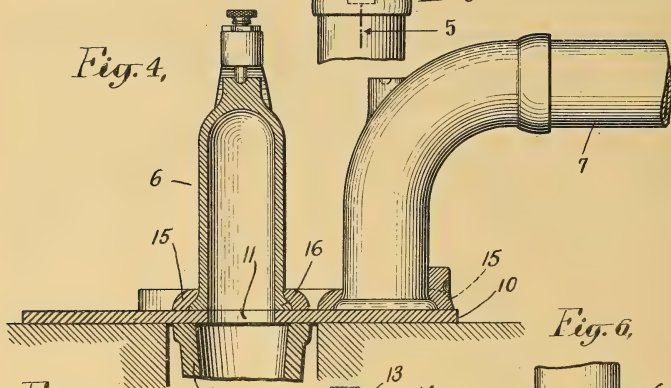


Fig. 5,

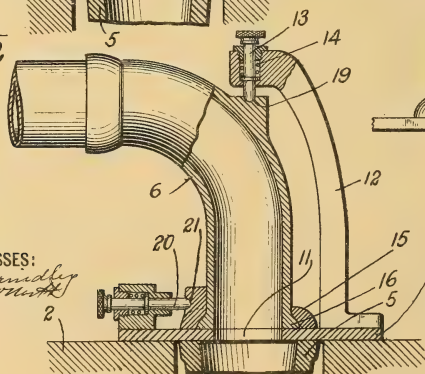
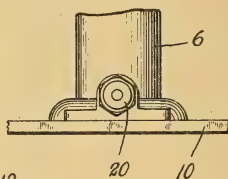


Fig. 6,



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INVENTORS
 Henry Barnes Tremaine
 Edward S. Votey
 BY
 C. W. H. H.
 ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY BARNES TREMAINE, OF WESTFIELD, AND EDWIN SCOTT VOTEY, OF SUMMIT,
NEW JERSEY, ASSIGNORS TO THE AEOLIAN COMPANY, A CORPORATION OF CON-
NECTICUT.

PHONOGRAPH AND THE LIKE.

1,248,757.

Specification of Letters Patent.

Patented Dec. 4, 1917.

Application filed January 23, 1915. Serial No. 3,954.

To all whom it may concern:

Be it known that we, HENRY BARNES TREMAINE and EDWIN SCOTT VOTEY, citizens of United States, residing, respectively, at Westfield and Summit, New Jersey, have invented jointly new and useful Improvements in Phonographs and the like, of which the following is a specification.

Our invention relates to improvements in 10 phonographs and the like and more particularly to means which readily permits the instrument to be used with any one of a plurality of sound-boxes. This permits the ready interchange between sound-boxes of 15 both the hill and dale and lateral cut record types and between different sizes and qualities of sound-boxes of the same type, also the same ready interchange between tone-arms appropriate to the several sound-boxes. 20 In the drawings, Figure 1 is a fragmentary vertical section of a phonograph showing our improvements in side elevation, the section being taken on the line 1—1 in Fig. 2 looking in the direction of the arrows; 25 Fig. 2 is a plan view of the same; Fig. 3 is an enlarged detail of Fig. 2; Fig. 4 is a vertical section partly in elevation on line 4—4 in Fig. 3 looking in direction of the arrows; Fig. 5 is a vertical section partly in elevation on line 5—5 in Fig. 3 looking in direction of the arrows; and Fig. 6 is a detail 30 view of the lower portion of Fig. 5 seen from the left.

Describing now the specific devices of the 35 drawings, 1 indicates the usual cabinet, 2 the top shelf, 3 the motor spindle, 4 the record turntable, and 5 the neck of the horn.

Our invention provides two tone-arms 6 and 7 and two sound-boxes 8 and 9. The 40 sound-boxes will differ in size or character and the tone-arms should be appropriate thereto. One kind of sound-box and tone-arm may be adapted to certain classes of records whereas another may be adapted to 45 reproduce to the best advantage, if at all, quite a different class of records. My invention permits the ready interchange from one to the other sound-box and tone-arm with the same facility that the user adjusts 50 the ordinary tone-arm and sound-box to the record.

Describing now the details, 10 is a stationary plate having a central opening 11 located over the neck of the horn. 12 is a 55 stationary upright member having an over-

hanging portion supporting a bearing pin 13 (Fig. 5) concentrically over the opening 11, said pin being spring pressed downwardly by the spiral spring 14.

15—15 are a pair of rings surrounding 60 the bases of the respective tone-arms, each ring being inwardly flanged to overlie the flanged base 16 of its tone-arm with a rotary bearing fit. Each ring has an integral flat lug 17 by which it is pivoted by a screw 18 65 to swing in face contact with the plate 10. The pivots 18 are positioned (compare Fig. 2) so that each ring can be swung into a position which will bring its tone-arm over the opening 11 in the plate 10 and the neck 70 of the horn, in which position the pivot pin 13 snaps down into the recess 19 (Fig. 5) in the shoulder of the tone-arm and thus forms an upper bearing about which the tone-arm can pivot as it swings with the 75 sound-box across the face of the record.

To give additional rigidity at this time to the lower bearing ring 15, I provide another spring-pressed pin 20 supported on the plate 10 and positioned to snap into a 80 recess 21 in the outside of the given ring 15 when in its playing position shown in Figs. 3 and 5.

Fig. 2 shows the left hand tone-arm and box in playing position. Should the next 85 record to be played make it desirable to change to the right hand sound-box and tone-arm, this is quickly accomplished by grasping the basal end of the tone-arm 6 (Fig. 2) and pulling it toward the left which 90 movement will force the spring-pins 13 and 20 out of their recesses and thereby release the parts so that said tone-arm 6 and its ring 15 can be swung into the out-of-the-way position shown by the dotted lines. It is 95 equally simple to bring the other tone-arm 7 into playing position by pushing it endwise to the left in Fig. 2 until its bearing ring 15 snaps into engagement with the pin 20, whereupon the sound-box can be ad- 100 justed into playing position on the record in the usual manner.

What we claim is:—

1. A sound reproducing or recording machine having a horn, a plurality of tone- 105 arms, a support having an opening coincident with the opening leading to the horn, and a plurality of rings each forming a lower bearing for one of the tone-arms, each ring having a connection with the support 110

permitting it to be swung into and out of registry with said opening to the horn.

2. A sound reproducing or recording machine having a horn, a plurality of tone-arms, a support having an opening coincident with the opening leading to the horn, a plurality of rings each forming a lower bearing for one of the tone-arms, each ring having a connection with the support permitting it to be swung into and out of registry with said opening to the horn and automatic means for releasably locking each of said rings in its said position of registry.

3. A sound reproducing or recording machine having a horn, a plurality of tone-arms, a support having an opening coincident with the opening leading to the horn, a plurality of rings each forming a lower bearing for one of the tone-arms, each ring having a connection with the support permitting it to be swung into and out of registry with said opening to the horn, and a pivot pin supported over the opening to the horn, arranged to releasably engage and constitute a bearing for each tone-arm when its ring is in its position of registry relatively to the opening to the horn.

4. A sound reproducing or recording machine comprising a horn having a single neck opening, and a plurality of tone arms,

either arm being movable at the horn end into and out of playing position relative to said neck opening to the exclusion of the other arm.

5. A sound reproducing or recording machine comprising a horn having a single neck opening, and a plurality of tone arms, any one of said arms being movable bodily relatively to said horn and exclusively of the other arms into playing position with respect to said neck opening.

6. A sound reproducing or recording machine comprising a horn, a support having an opening coincident with the opening leading to the horn, and a plurality of tone arms pivoted to said support eccentrically of the support opening, any one of said arms being movable bodily along said support and exclusively of the other arms into and out of position to register with said support opening.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses, this 22d day of January, 1915.

HENRY BARNES TREMAINE.
EDWIN SCOTT VOTEY.

Witnesses:

E. W. SCHERR, Jr.,
EDWARD W. NORTH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

(GRAPHOPHONE PATENT)

1,248,922

G. Rottman

ALBUM FOR HOLDING PHONOGRAPH RECORDS

1,248,922 ----- G. Rottman,

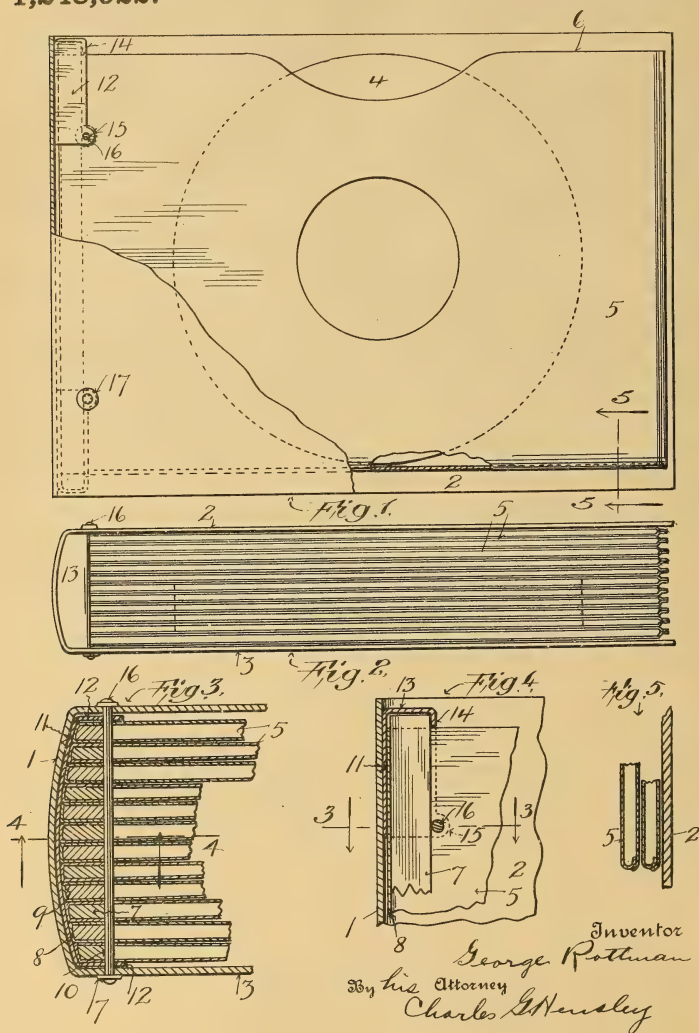
Patented Dec. 4, 1917.

Filed July 8, 1916.

G. ROTTMAN.
ALBUM FOR HOLDING PHONOGRAPH RECORDS.
APPLICATION FILED JULY 8, 1916.

1,248,922.

Patented Dec. 4, 1917.



UNITED STATES PATENT OFFICE.

GEORGE ROTTMAN, OF NEW YORK, N. Y.

ALBUM FOR HOLDING PHONOGRAPH-RECORDS.

1,248,922.

Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed July 8, 1916. Serial No. 108,243.

To all whom it may concern:

Be it known that I, GEORGE ROTTMAN, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Albums for Holding Phonograph-Records, of which the following is a specification.

My invention relates to albums for holding phonograph records or other flat objects. The object of the invention is to provide a very durable album capable of withstanding the wear and tear to which such devices are subjected. When an album is filled with records the weight is considerable and no matter how carefully the album and its contents are handled the strain of the various parts tends to break down the binding, and my improved device is of a very strong and durable construction.

Another object of my invention is to provide an album of simple construction and which can be made and assembled at a low cost.

In the drawing forming part of this application—

Figure 1 is an elevation of my improved album with parts broken away to show the construction,

Fig. 2 is a plan view thereof,

Fig. 3 is a sectional view, taken on the line 3—3 of Fig. 4,

Fig. 4 is a sectional view, taken on the line 4—4 of Fig. 3, and

Fig. 5 is a sectional view, taken on the line 5—5 of Fig. 1.

The album consists primarily of a number of holders or envelopes for containing the records, a back or cover, and means for securing or binding the parts together.

The outer inclosure comprises a back 1, and the covers 2, 3, which open and close the same as the covers of a book and which are connected to or are integral with the back. The devices for holding the records 4 consist of envelopes 5 closed around three edges and having open tops 6 for the insertion and withdrawal of a record. These envelopes may be made in any desired way as my invention requires no modification of the envelop. There is a holding strip 7 preferably of cardboard, placed inside each envelop and near the back edge 8 thereof and they extend upwardly to project above the upper edge of the envelop and they also

project through the bottom thereof and below the lower edges of the envelopes. It will be apparent that if these holding strips are firmly secured in place the envelopes can not be removed from the binding. If these strips are about as thick as the records to be kept in the album they will so space the several envelopes that the latter will lie flat or extend straight out from their securing means when they are all supplied with records.

The back 1 is preferably curved or arched outwardly between the covers, the same as the back of a book, and the strips 7 are of graduated width from the endmost strips toward the middle strips. The outer edges 9 of these strips therefore, taken as a whole, are arched or curved to correspond with the back 1, but their forward edges 10 all lie in the same plane.

Instead of attaching a metal holder to the exterior for securing the strips 7 or merely stapling the cover and strips together I have provided caps or end pieces which are secured inside the covers and back and which secure the strips from displacement edgewise and lengthwise. These caps, there being one at the top and one at the bottom of the album, consist of an arched back 11 against which the edges 9 of the strips and the envelopes abut, of sides 12 which inclose the side edges of the outer envelopes, the top 13 and the flange 14 extending downwardly therefrom. These caps have perforated ears 15 and rods or pins 16 pass through these ears and through the covers 2, 3 and are upset or riveted at 17 to secure the parts together. These rods or pins secure the cover and the caps together and they lie across the front edges 10 of the strips 7 and prevent these strips from displacement forwardly. In this way the envelopes are held from edgewise displacement toward the front or open side of the album.

The strips 7 are further held from displacement forwardly by the flange 14 which engages over their outer ends, so that the strips are held at different portions.

The strips 7 are held against edgewise displacement by the end walls 13 of the caps and these end walls protect the ends of the strips 7 as well as the corners of the envelopes.

It will be apparent that the various parts may be very inexpensively made and in any

quantity and that they may be very quickly assembled into completed albums without the use of special machinery.

There are no exterior metal parts to injure or scratch any surface on which the album may be placed. The album is very substantial, the parts will not separate under even careless handling, and the envelopes are so locked in place that there is no possibility of their pulling out of the album.

Having described my invention, what I claim is:

1. An album comprising a back and covers, envelopes therein, securing strips each inside one edge portion of an envelop and having their ends projecting at the tops and bottoms of the envelopes and means connected with said back extending across the outer edges of said strips to prevent their displacement and means engaging the ends of said strips to secure them against endwise displacement, to hold the envelopes in said album.

2. An album comprising a curved back and covers, envelopes therein, securing strips each inside one edge portion of an envelop and having their ends projecting at the tops and bottoms of the envelopes, said strips being of graduated widths whereby their rear edges will conform to said curved back and whereby their forward edges will aline and a cross bar connecting said covers and lying across the forward edges of said strips.

3. An album comprising a back and

covers, a plurality of envelops therein, securing strips each inside one edge of an envelop and having their ends projecting above and below the envelops, caps disposed behind said strips, having side plates inclosing the strips and the edges of said envelops and having flanges engaging over the ends of said strips to prevent their withdrawal endwise and edgewise and rods or pins passing through the covers and said caps and lying in front of the forward edges of said strips.

4. An album comprising a curved back, and covers, envelops therein, securing strips each inside one edge of an envelop and having their ends projecting above and below the envelops, said strips being of graduated width whereby their rear edges will conform to said curved back and whereby their forward edges will aline, caps for the tops and bottoms of the strips, arranged inside the back and covers, said caps having curved rear walls corresponding to said back and lying back of the said strips and having side members inclosing the strips and having top plates and downturned flanges engaging over the ends of said securing strips and rods or pins extending through said covers and said caps and lying across the forward edges of said securing strips.

Signed at the city, county and State of New York, this 26th day of June, 1916.

GEORGE ROTTMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH

1,249,251 ----- M. W. Turnquist,
Patented Dec. 4, 1917.
Filed Feb. 26, 1917.

M. W. TURNQUIST.

PHONOGRAPH.

APPLICATION FILED FEB. 26, 1917.

1,249,251.

Patented Dec. 4, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

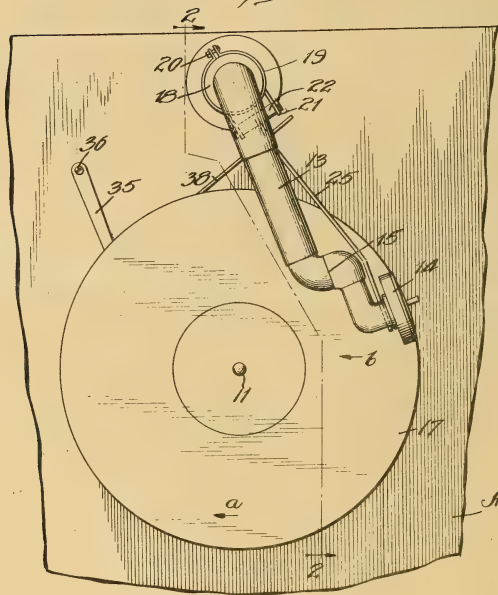
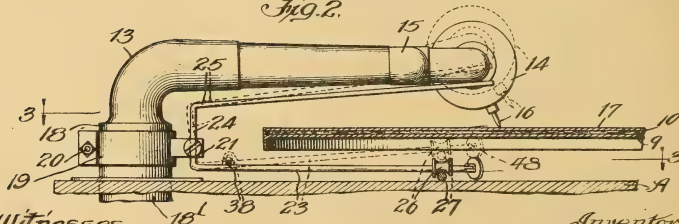


Fig. 2.

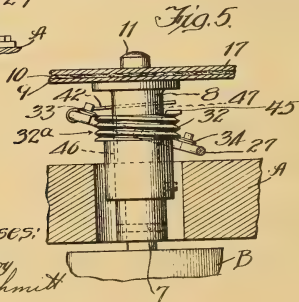
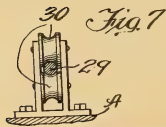
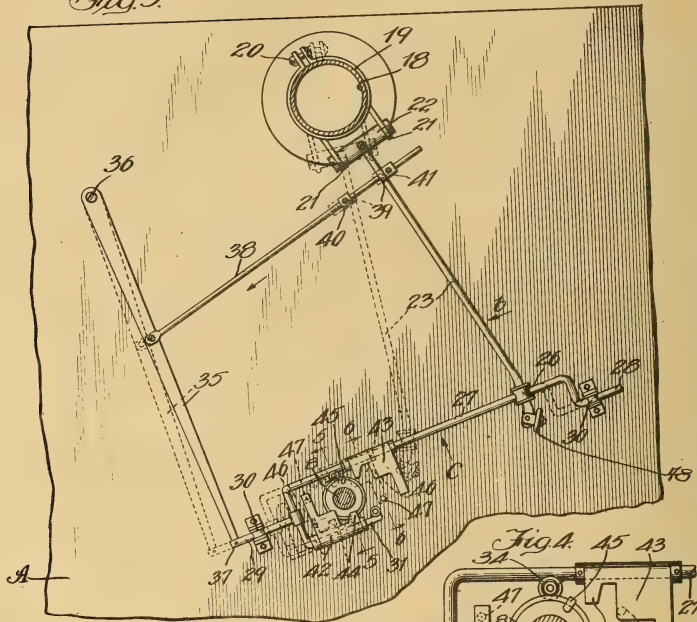


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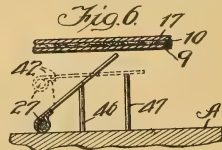
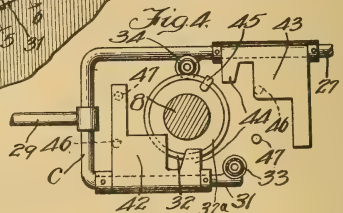
1,249,251.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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PHONOGRAPH.

1,249,251.

Specification of Letters Patent.

Patented Dec. 4, 1917.

Application filed February 26, 1917. Serial No. 150,879.

To all whom it may concern:

Be it known that I, MAGNUS W. TURNQUIST, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Phonographs, of which the following is declared to be a full, clear, and exact description.

This invention relates to phonographs, and its principal object is to provide improved means for returning the tone arm and therewith the reproducer and needle to their starting place, whereby the musical selection or other sound produced may be repeated automatically without any further attention on the part of the attendant. Another object is to provide a simple, comparatively cheap, efficient and practical mechanism for accomplishing this result. Another object is to provide a repeating mechanism for phonographs, actuated by the turntable or disk which supports the record. Another object is to produce a repeating mechanism for phonographs, having adjustment means to accommodate various sizes of record disks. With these and other objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and more particularly defined in the appended claims.

The invention is clearly illustrated in the drawings accompanying this specification, in which:

Figure 1, is a plan of a fragment of a phonograph, showing a simple embodiment of the present invention applied thereto; Fig. 2, is a view partly in side elevation and partly in vertical section of the parts seen in Fig. 1, the line of section being indicated at 2—2 in Fig. 1; Fig. 3, is a view partly in plan and partly in horizontal section, the line of section being taken at 3—3 in Fig. 2; Fig. 4, is a detail plan of a fragment of a certain oscillatory and reciprocity frame; Fig. 5, is a detail vertical section taken on the line 5—5 of Fig. 3; Fig. 6, is a detail, vertical section taken on the line 6—6 of Fig. 3; and Fig. 7, is a detail end view of certain anti-friction bearing rollers. Referring to said drawings, the reference character A, designates the top of a phonograph cabinet or case of ordinary construction, in which is contained the usual motor (a fragment of which is shown at B), for operating the phonograph mechanism. In accordance with the usual and common prac-

tice, said motor drives a spindle or shaft 7, to which is secured a sleeve 8, that carries the turntable 9, the upper face of the turntable is provided with a felt cover 10, and the usual spindle 11, projects up from the table at its axis of rotation.

The tone arm 13, is rotatively mounted on a vertical axis above the top A, and overhangs the turntable. It is provided with any of the ordinary and well known reproducers 14, which is hingedly connected to the tone arm on a horizontal axis as at 15, and the stylus, or needle, 16, is employed in connection with the reproducer for traveling in the groove of the record disk 17. The horn or sound box 18, may be connected with the tone arm 13, in any of the well known methods, and the parts thus described may be of any of the common phonographs employing a disk record. It is understood that in the operation of the phonograph, the turntable and record disk rotate in the direction indicated by the arrow *a*, in Fig. 1, and that the needle, reproducer and tone arm are carried in the direction indicated by the arrow *b*, by the sidewise action of the walls of the groove of the record upon the needle.

Secured upon the vertical portion 18, of the tone arm, is a clip 19, which encircles said portion 18, and is fastened thereon as for instance by means of a screw 20, which extends through outturned ears formed on the clip. On the opposite side of the clip are two ears 21, between which is secured a block 22, which block is free to turn upon a horizontal axis. Said block may be secured to the ears 21, by screws which permit of the rotation of the block upon the ears of the clip. Fixedly secured to said block 22, is a frame shifting arm 23, which extends underneath the turntable, and also has an upwardly bent portion 24, that extends through the block 22, and terminates in an arm 25, that projects underneath the reproducer, as clearly illustrated in Figs. 1, and 2; said arm acting to lift the reproducer and needle during the intervals that the tone arm is returned to its starting position. Upon the frame shifting arm 23, is slidably mounted a roller 26, which runs upon a track 27, of an oscillatory and reciprocity frame C, which is provided upon its ends with shafts or spindles 28, 29, that are rotatively and slidably mounted in bearings here shown as comprising upper and lower rollers 30. At a point adjacent the turn-

table spindle 7, the frame C, is provided with an arm 31, lying parallel with the track 27, and said track 27, and arm 31, are provided with devices for engaging the threads 32, of a worm or screw 32^a, which is secured to the sleeve 8. Said devices are here shown in the form of bevel edged rollers 33, 34, journaled upon pins secured to said track 27, and arm 31, and they are slightly offset with respect to each other so that when one roller is brought into engagement with the threads of the worm or screw, the other one is just leaving the threads of the screw, as will appear more fully later on.

The frame shifting arm 23, is arranged to shift the oscillatory and reciprocatory frame C, whenever the needle of the reproducer approaches the ends of the limits of its travel in either direction, the purpose of which is to bring one or the other of the rollers 33, 34, into engagement with the threads of the worm to thereby rock the frame C, in either direction to raise or lower the reproducer, and therewith the needle. The mechanism illustrated will now be described.

A lever 35, is fulcrumed to a support at 36, which support may be the top A, of the cabinet, and said lever 35, is pivotally connected to the oscillatory and reciprocatory frame, as at 37. A link 38, connects the lever 35, with the frame shifting arm 23. Said arm 23, is provided with an ear 39, through which said link 38, passes, and collars 40, 41, are adjustably secured upon said link 38, one upon each side of the ear 39. Said collars are so located upon the link 38, that when the needle approaches either limit of its travel, the ear 39, strikes one of the collars 40, 41, depending upon which direction the tone arm is moving, thereby moving the link 38, endwise, and swinging the lever 35, upon its fulcrum, and shifting the oscillatory and reciprocatory frame C, in an endwise direction. Assuming that the turntable and record are rotating in the direction of the arrow *a*, in Fig. 1, the needle, reproducer and tone arm are moving in the direction of the arrow *b*, and the frame shifting arm 23, is moving in the direction indicated by the arrow *b*, in Fig. 3, from the position shown in full lines to that shown in dotted lines in said Fig. 3, the track 27, of the oscillatory and reciprocatory frame will have been swung down previously to this time, and the arm 31, will have been swung upward to a position where the roller 33, will enter the groove between the threads of the worm 32^a, at or near the upper end of the worm. When the ear 39, engages the collar 40, the continued movement of the frame shifting arm in the direction of the arrow *b*, in Fig. 3, will effect an endwise movement of the link 38, in the direction of the arrow, thereby swinging the lever 35, shifting the

oscillatory and reciprocatory frame from the position shown in full lines in Fig. 2, toward the position indicated in dotted lines in said figure.

Rotatively mounted upon the track 27, and the arm 31, and fixed against endwise movement thereon, are shift plates 42, 43, which have shoulders 44, lying in the path of a stud or other projection 45, secured to and projecting up from the worm 32^a. Normally said shoulders 44, are out of the path of the projection 45, and when overlying said projection, are held out of the path of said projection by pins 46, that extend upward from the top A, of the cabinet (see Fig. 6). Whenever the oscillatory and reciprocatory frame is moved to bring a roller 33, or 34, toward the worm, the plate 42, or 43, (that is carried by the track 27, or arm 31, which is in raised position,) is being supported by a pin 47, to hold the shoulder 44, above the rotating projection 45, until the roller has almost reached the worm or screw, at which time the plate drops off the pin 47, and lodges upon the top of the worm or screw in position to be struck by the projection, whereupon the shoulder is struck by the projection and the frame is quickly shifted to bring the roller into engagement with the threads of the worm. Said worm or screw is a lefthand worm, and rotation of the screw in the direction of the arrow *a*, in Fig. 1, will cause the roller, when in engagement therewith to travel downward, thereby swinging the frame C, from one of its inclined positions to its other inclined position.

Upon the outer end of the frame shifting arm 23, is journaled a friction roller 48, which is set at an angle to the arm 23, as shown, and in the return movement of the arm, said friction roller is raised into contact with the underside of the turntable 9, to effect its travel toward the outer edge thereof.

In the operation of the device, the motor is started, and the turntable and record disk thereon are rotated in the direction of the arrow *a*, in Fig. 1. The tone arm is first manually moved to its extreme operative position at the right, as viewed in Fig. 1, and the reproducer is lowered to bring the needle into the outer end of the spiral groove of the record disk. The tone arm is thereupon slowly moved in the direction of the arrow *b*, in Fig. 1, as is usual, and the frame shifting arm 23, by reason of its connection with the tone arm, is carried along therewith toward the left. It is to be understood that during movement of the tone arm and frame shifting arm toward the left, the oscillatory and reciprocatory frame C, occupies the inclined position seen in Fig. 5, that is to say the track portion 27, is at its lowermost position and the arm 31, is at its uppermost

position; the frame is also at the limit of its stroke toward the right as viewed in Fig. 3, the roller 34, is under the lowermost thread of the worm and the roller 33, is located at the right of the worm in line with the thread at the top thereof; the shift plate 43, is to one side of the projection 45, and is held in the inclined position seen in Fig. 6, by the pin 46, while the shoulder 44, of the shift plate 42, is in line with the path of movement of the projection 45, but held thereabove by the pin 47.

As the needle approaches the inner end of the spiral groove of the record disk, the frame shifting arm 23, approaches the collar 40, of the link 38, and finally engages it; with the continued movement of said arm, (which is caused by the continued movement of the reproducer and tone arm toward the left) the ear 39, forces the collar 40, and therewith the link 38, toward the left, swinging thereby the lever 35 toward the left and consequently shifting the frame C, toward the left until the shift plate 42, drops off the pin 47, whereupon the shoulder 44, falls into the path of the oncoming projection 45, which thereupon strikes and quickly pushes back the shift plate and therewith the frame C, bringing the roller 33, into the engagement with the uppermost threads of the worm just as the roller 34, is moved away from the lower side of the worm. The worm continues to rotate and the roller 33, is thereupon moved downward by reason of its engagement with the worm threads, and the frame C, is turned upon its axis thereby bringing the arm 31, thereof to its lowermost position, and its track 27, to its uppermost position. The roller 26, is lifted by the track, and the combined frame shifting arm 23, and reproducer lifting arm 25, is thereupon swung upward, the reproducer swung upward, thereby disengaging the needle from the record disk, and simultaneously the friction roller 48 is brought into frictional engagement with the lower face of the turntable 9, the continued rotation of which effects the outward travel of the friction roller, and consequent movement of the arms 23, 25, toward the right. The arm 23, being secured to the tone arm, turns it to the right, and as the arm 23, approaches its limit of movement, its ear 39, engages the collar 41, pushes it to the right, and therewith the link 38, which swings the lever 35 to the right, thereby shifting the frame C, to the right until the shift plate 43, drops off the pin 47, and its shoulder 44, is struck by the projection 45, of the worm and the frame C, and its roller 34 (which at this time is in raised position) is quickly shifted, bringing the roller 34, into engagement with the worm, which lowers the roller and track side of the frame C, to its former position. As the

track side moves down, the arms 23, 25, are allowed to swing down, and the reproducer is lowered, bringing the needle back on the record into the groove thereof, whereupon the action described is repeated over and over until the motor is stopped.

It is to be observed that the frame C, may be constructed of light material, such as wire, and that it is sufficiently flexible to permit slight bending of the transverse portions thereof, so that when the roller 33 lies under the worm, the friction roller 48 is pressed into frictional contact with the under face of the turntable.

Furthermore the collars 40, 41, may be adjusted along the link 38, to accommodate the mechanism to various sizes of record disks, or disks having more or less space for the spiral groove.

More or less variation of the exact form of construction shown and described is possible, without departing from the spirit of this invention; I desire, therefore, not to limit myself to the exact construction shown and described, but intend in the following claims to point out all of the invention disclosed herein.

I claim as new and desire to secure by Letters Patent:

1. Repeating mechanism for phonographs comprising a horizontally and vertically oscillatory arm arranged to be secured to the tone arm of a phonograph, a reproducer lifting arm operatively connected with said first mentioned arm to move in unison therewith, an oscillatory and reciprocatory element having a track for supporting said first mentioned arm, a worm secured to and rotating with the turntable spindle of a phonograph, said frame being adapted for engagement with said worm on opposite sides thereof, operative connections between said first mentioned arm and frame for shifting said frame into position for engagement with said worm, and a friction roller journaled upon said first mentioned arm on an axis at an angle thereto and adapted to be brought into frictional contact with said turntable.

2. Repeating mechanism for phonographs comprising a frame shifting arm and a reproducer lifting arm operatively connected to move in unison, said arms being secured to the tone arm of a phonograph, and having an independent vertical movement thereon, an oscillatory and reciprocatory arm lifting frame having a track upon which said frame shifting arm is supported, a worm rotating with the turntable of the phonograph, said frame having oppositely disposed offset worm engaging members adapted for alternate engagement with said worm, operative connections between said frame shifting arm and frame, and a friction roller journaled upon said frame shifting arm on an

axis lying at an angle to said arm and adapted to be brought into frictional contact with said turntable whenever the track portion of said frame is moved to its uppermost position.

3. Repeating mechanism for phonographs comprising a frame shifting arm and a reproducer lifting arm, connected to move in unison, said arms being pivotally connected to the tone arm of the phonograph on a horizontal pivot, and moving with said arm in a horizontal plane, an oscillatory and reciprocatory arm lifting frame, operative connections between said frame shifting arm and frame, a worm rotating with the turntable of the phonograph, said frame having oppositely disposed and offset rollers adapted for alternate engagement with said worm and a friction roller journaled upon said frame shifting arm on an axis disposed at an acute angle with respect to said frame shifting arm, said friction roller being arranged for frictional contact with the underside of the turntable.

4. Repeating mechanism for phonographs comprising a combined frame shifting means and reproducer lifter, connected to and moved in one direction by the tone arm of the phonograph and having a friction roller journaled thereon, and adapted to frictionally engage the underside of the turntable of the phonograph, whereby the combined frame shifting means and reproducer lifter are moved in the opposite direction by the turntable of the phonograph, an oscillatory and reciprocatory frame, said frame having a track, supporting said frame shifting means, and serving, during the return movements of the frame shifting roller, to operatively engage the said means with the turntable, and a worm rotating with said turntable for oscillating said frame.

5. Repeating mechanism for phonographs, comprising frame shifting means connected to and moved by the tone arm of the phonograph in one direction, and having a friction roller journaled thereon, and adapted to frictionally engage the underside of the turntable of the phonograph, whereby the frame shifting means is moved in the opposite direction by the turntable of the phonograph, a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a track supporting said means during the return movement thereof in operative engagement with said turntable, and a worm, rotating with said turntable, for oscillating said frame.

6. Repeating mechanism for phonographs, comprising frame shifting means connected to and moved in one direction by the tone arm of the phonograph, and having a friction roller adapted for frictional engage-

ment with the underside of the turntable of the phonograph for returning said means to its original position, a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means and having a track adapted during the return movements of said means to hold said friction roller in frictional engagement with said turntable, and a worm, rotating with said turntable for oscillating said frame.

7. Repeating mechanism for phonographs, comprising frame shifting means, connected to and moved in one direction by the tone arm of a phonograph and having a friction roller adapted for frictional engagement with the underside of the turntable of the phonograph, for returning said means to its original position, a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a track adapted when in one position to frictionally hold said friction roller in engagement with said turntable, and a worm rotating with said turntable for oscillating said frame.

8. Repeating mechanism for phonographs, comprising frame shifting means, connected to and moved in one direction by the tone arm of a phonograph and having a friction roller adapted for frictional engagement with the turntable of the phonograph, for returning said means to its original position, a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a track adapted when in one position to frictionally hold said friction roller in engagement with said turntable, said frame having screw engaging means, and a screw rotating with said turntable, the threads of which are adapted to be engaged alternately by said screw engaging means of said frame.

9. Repeating mechanism for phonographs, comprising frame shifting means, connected to and moved in one direction by the tone arm of a phonograph and having a friction roller adapted for frictional engagement with the turntable of the phonograph, for returning said means to its original position, a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a track adapted when in one position to frictionally hold said friction roller in engagement with said turntable, said frame having oppositely disposed offset rollers, and a screw rotating with said turntable, the threads of which are adapted to be engaged alternately by said rollers.

10. Repeating mechanism for phonographs, comprising frame shifting means, connected

to and moved in one direction by the tone arm of a phonograph and having a friction roller adapted for frictional engagement with the turntable of the phonograph, for
5 returning said means to its original position, a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a
10 track adapted when in one position to frictionally hold said friction roller in engagement with said turntable, means rotating with said turntable for oscillating said frame to raise and lower the track thereof,
15 and additional frame shifting means for quickly shifting said frame, moving with said frame oscillating means.

11. Repeating mechanism for phonographs, comprising frame shifting means, connected
20 to and moved in one direction by the tone arm of a phonograph and having a friction roller adapted for frictional engagement with the turntable of the phonograph, for returning said means to its original position,
25 a reproducer lifting arm actuated by said frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a track adapted when in one position to frictionally
30 hold said friction roller in engagement with said turntable, means rotating with said turntable for oscillating said frame to raise and lower the track thereof, shift plates carried by said frame, and means rotating with
35 said frame oscillating means, arranged to engage and quickly shift said frame when approaching the limits of its strokes.

12. Repeating mechanism for phonographs, comprising frame shifting means connected
40 to and moved in one direction by the tone arm of a phonograph and having a friction roller adapted for frictional engagement with the turntable of the phonograph, for returning said means to its original position,
45 a reproducer lifting arm actuated by said

frame shifting means, an oscillatory and reciprocatory frame, reciprocated by said frame shifting means, and having a track adapted when in one position to frictionally
50 hold said friction roller in engagement with said turntable, a screw rotating with said turntable, oppositely disposed and offset means on said frame arranged to alternately engage with the threads of said screw, to oscillate said frame, a projection on said
55 screw, shift plates carried by said frame, means for normally supporting said shift plates out of the path of movement of said projection, but located so as to permit engagement of said projection with said shift
60 plates when they approach the limits of their movements with the frame.

13. In a repeating mechanism for phonographs, a frame shifting arm moved in one direction by the tone arm, and having a
65 friction roller set at an acute angle to the direction of rotation of the turntable of the phonograph, a reproducer lifting arm actuated by said frame shifting arm, a screw rotating with the turntable, means actuated
70 by said screw for moving said roller into and out of frictional engagement with said turntable, and operative connections between said frame shifting arm and said means, there being lost motion between said arm
75 and said operative connections to permit of a predetermined sweep of said arm without affecting said operative connections.

14. In a repeating mechanism for phonographs, a left-handed screw secured to and
80 rotating with the turntable supporting spindle, an oscillatory and reciprocatory frame having thread engaging means adapted to be alternately brought into engagement with the threads of said screw, means operated
85 by the tone arm for effecting movement of the frame in one direction, and means operated by the turntable for effecting movement of the frame in the opposite direction.

MAGNUS W. TURNQUIST.

LIGHTING ATTACHMENT FOR SOUND REPRODUCING MACHINES.

1,249,288 ----- G. E. Bernecker,
Patented Dec. 4, 1917.
Filed Aug. 4, 1916.

G. E. BERNECKER.
LIGHTING ATTACHMENT FOR SOUND REPRODUCING MACHINES.

1,249,288.

APPLICATION FILED AUG. 4, 1916.

Patented Dec. 4, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

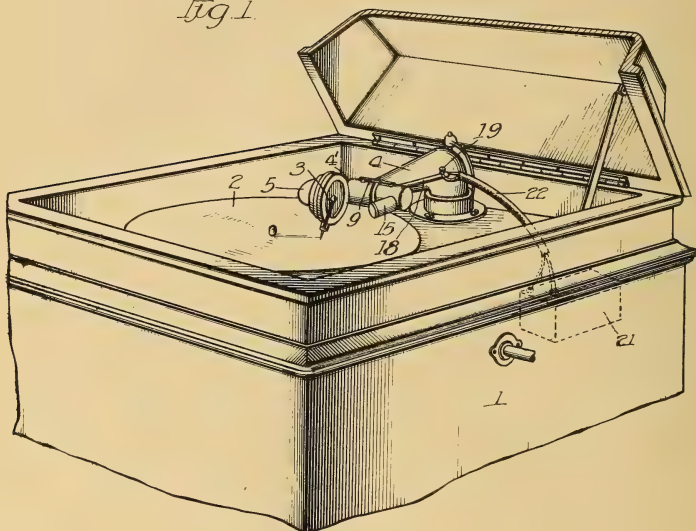


Fig. 2.

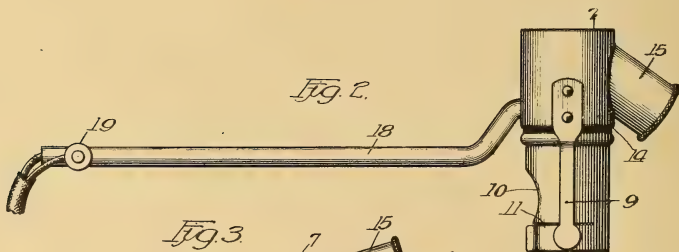
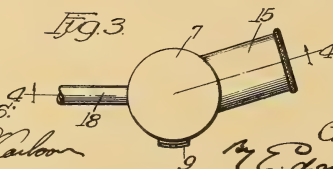


Fig. 3.



Witnesses:
Arthur W. Carlson

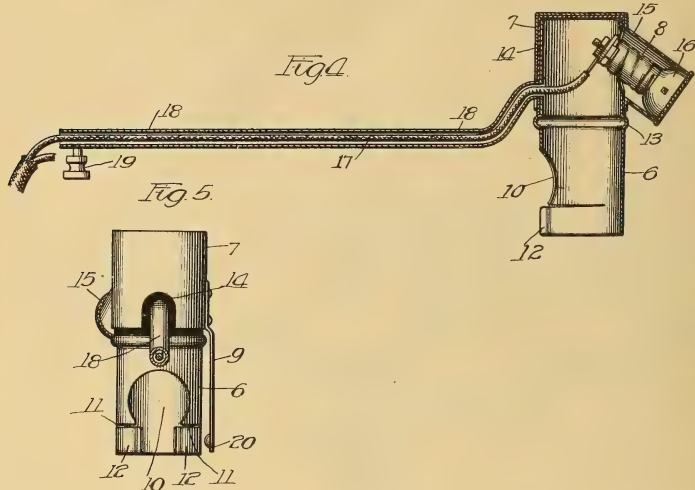
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G. E. BERNECKER.
LIGHTING ATTACHMENT FOR SOUND REPRODUCING MACHINES.
APPLICATION FILED AUG. 4, 1916.

1,249,288.

Patented Dec. 4, 1917.

2 SHEETS—SHEET 2.



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LIGHTING ATTACHMENT FOR SOUND-REPRODUCING MACHINES.

1,249,288.

Specification of Letters Patent.

Patented Dec. 4, 1917.

Application filed August 4, 1916. Serial No. 113,180.

To all whom it may concern:

Be it known that I, GEORGE E. BERNECKER, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Lighting Attachments for Sound-Reproducing Machines, of which the following is a specification.

This invention relates to a lighting attachment for sound reproducing machines.

It is usually difficult to obtain proper light for a sound reproducing machine to change the records and needles and apply the needles to the records in operating the machine.

The present invention has for its object to provide an improved lighting means which may be readily applied to a sound reproducing machine to furnish the required light.

Another object is to provide an improved lighting attachment which is normally inactive but which is adapted to be operated in the act of manipulation of the sound reproducing machine in changing records or needles.

Another object is to provide a lighting attachment which may be supported independently of the sound box of the machine but which will serve to effectively illuminate the needle carried thereby and that portion of the record beneath the sound box.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate embodiments of the invention. The views of said drawings are as follows:

Figure 1 is a perspective view showing the lighting attachment applied to a Victrola.

Fig. 2 is a side elevation of the lighting attachment.

Fig. 3 is a top plan view thereof.

Fig. 4 is a cross section view.

Fig. 5 is an end elevation.

The sound reproducing machine to which the invention is applied will first be briefly described.

It comprises a frame or box 1 containing apparatus for supporting and rotating the flat disk record 2. Bearing upon the disk is a needle 3 carried by a sound box which is connected with the U-shaped arm 5. The U-shaped arm 5 is pivotally mounted to

swing in a bearing 4' carried by the arm 4 55 which is supported by the frame 1.

The lighting attachment is constructed so that it may be quickly applied to and be supported by the bearing 4' of the arm 4.

The attachment comprises in general a 60 casing 6 arranged to fit over the end of the bearing 4', a cap 7 mounted on one end of the casing 6 and insulated therefrom, an electric lamp 8 carried by the cap 7 and a switch 9 for completing the circuit to the 65 lamp.

The casing 6 is preferably cylindrical in shape. It has an opening 10 in one side thereof and communicating with said opening are slots 11 which form spring fingers 12 in the casing adapted to grip the circular end of the bearing 4'. This construction permits the casing to be readily slipped over the end of the bearing 4', the resiliency of the casing and the fingers 12 serving to hold 75 the lighting attachment in place. A bead 13 is formed in the casing for preventing it being moved beyond a certain position on the bearing 4'. This bead properly positions the casing on the bearing and insures 80 that the ray of light from the attachment is properly directed.

The cap 7 fits over one end of the casing 6 and is thoroughly insulated therefrom by an insulating cap 14 which surrounds the end 85 of casing 6 and extends down to bead 13. The cap 7 does not extend quite to the bead 13, a short space being left to prevent electrical connection between the cap and the casing. The cap has a cylindrical projection 90 15 extending therefrom for supporting the electric lamp 8. This projection is located at an angle so as to throw the beam of light from the lamp directly on the record where the needle is applied. 95

The electric light 8 may be of any suitable type. As shown, it comprises a small electric bulb carried in a hemispherical holder and reflector 16 which is arranged to be received and held in the end of the cylindrical projection 15 of cap 7. One terminal 100 of the lamp is connected through the holder 16 to the projection 15 and the cap 7, the other terminal being connected to a conductor 17 which is led out through a conduit 18, said conduit forming a stem or handle for the attachment and also serving as a conductor from the casing 6 to the bind-

ing screw 19 mounted thereon. It will thus be seen that if the casing 6 and the cap 7 are connected electrically, a circuit will be completed to the lamp, this circuit being as follows: through the conductor 17, the lamp 8, the holder 16, the projection 15, the cap 7, casing 6, and conduit 18 to the opposite terminal 19.

The cap 7 and the casing 6 are connected electrically by means of the switch 9 which is normally open. This switch comprises a suitable spring made of conducting material and attached to the cap 7. The spring extends over the casing 6 and is provided on its end with a small contact point 20. Under the influence of the pressure of the hand of an operator the spring is forced into contact with the casing 6 and a circuit to the light completed as noted above.

The attachment is constructed so that when it is applied to the bearing 4' the switch 9 is at the top of the attachment as shown in Fig. 1. Accordingly when the operator grasps the arm 5 and the needle holding apparatus to change the needle or to move it on the record he automatically touches the switch 9 and closes a circuit to the light 8 so that a beam of light is thrown on the record where the needle is applied. The location of the switch is such that it will invariably be closed by anyone who manipulates the machine without any conscious effort on his part.

The attachment is supplied with electrical energy from any suitable source. In the present instance a battery 21 is shown which may be located in any part of the machine. The battery is connected to the attachment by suitable conductors 22 which are brought up at the rear of the machine.

The shape and size of the attachment is such that when it is placed in position it is scarcely noticeable and to any ordinary observer appears to be a part of the machine. The casing 6 and the cap 7 correspond in shape to the bearing 4' and appear to be merely an extension of the arm 5. The conduit 18 extends along the arm 4 and is not noticeable. The conductors 22 at the rear of the machine are small and in such a position that they are not readily observed.

It will thus be seen that a simple attachment has been provided which may be readily applied to existing machines. When applied it does not detract from the appearance of the machine. Further, it does not add to the weight of the sound box for the attachment is supported entirely by the arm 4. A beam of light is thrown on the needle when the needle carrying means is manipulated because ordinary manipulation of the needle carrying means will almost invariably result in a closing of the switch. Very little energy is required to operate the lamp as the circuit to the lamp is normally open

and energy is consumed only when the light is needed. The switch for closing the circuit may be closed without special effort on the part of the operator. The attachment is simple, inexpensive, economical and efficient.

It is to be understood that the structure shown is for purposes of illustration only and that other structures may be devised which come within the spirit and scope of the appended claims.

What I claim and desire to secure by United States Letters Patent is:—

1. The combination with a sound reproducing machine having an arm, a sound box pivotally connected thereto, and a needle associated with the sound box whose downward pressure is not increased by said arm of an electric lighting attachment supported wholly by said arm to illuminate the record and a switch carried by said attachment for completing an electric circuit to the attachment.

2. The combination with a sound reproducing machine having an arm to which is pivoted a U-shaped arm carrying a needle whose downward pressure is not increased by said first named arm, of an electric lighting attachment supported wholly by said first named arm and arranged to throw a beam of light on the record, said attachment having a switch thereon adapted to be operated to energize the light in the act of manipulating said U-shaped arm.

3. The combination with a sound reproducing machine having an arm to which is pivoted a U-shaped arm carrying a needle, of an electric lighting attachment applied to said first named arm and arranged to throw a beam of light on the needle, said attachment having a conduit projecting along the main arm of the machine and being also provided with a switch on top of the same for completing an electric circuit to the attachment.

4. An attachment for sound reproducing machines, comprising a casing, a cap attached to one end of said casing and insulated therefrom, said cap carrying an electric lamp and being connected to one terminal of said lamp, the other terminal of said lamp being connected by a conductor to one terminal of an electric circuit and means for completing a circuit from said cap to said casing, said casing being connected to the opposite terminal of an electric circuit.

5. An attachment for sound reproducing machines, comprising a casing, said casing having a hollow conduit attached thereto and connected to one terminal of an electric circuit, a cap carried by said casing and insulated therefrom, said cap having an electric lamp mounted therein, one terminal of the lamp being connected to the cap and the other to an electric conductor which is led out through said conduit, and means for

completing a circuit from said cap to said casing to complete the circuit of said lamp.

6. The combination with a sound reproducing machine having an arm with a bearing disposed at right angles thereto and a U-shaped arm pivoted in said bearing and carrying a sound box and needle, of an electric lighting attachment comprising a tubular casing telescoped over said bearing and constituting, in effect, a longitudinal extension thereof, and an electric lamp associated with said casing for throwing a beam of light on the record.

7. The combination with a sound reproducing machine having an arm, a sound box pivotally connected thereto and a needle as-

sociated with the sound box whose downward pressure is not increased by said arm of an electric lighting attachment supported wholly by said arm and arranged to throw a beam of light on the record, said attachment having a switch thereon adapted to be operated to energize the light in the act of manipulating the sound box.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

GEORGE E. BERNECKER.

Witnesses:

BERTHA L. COXE,
G. T. CASE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH ILLUMINATING APPLIANCE.

1,249,374 ----- M. H. Gaba.

Patented Dec. 11, 1917.

Filed Mar. 3, 1917.

M. H. GABA.
 PHONOGRAPH ILLUMINATING APPLIANCE.
 APPLICATION FILED MAR. 3, 1917.

1,249,374.

Patented Dec. 11, 1917.
 2 SHEETS—SHEET 1.

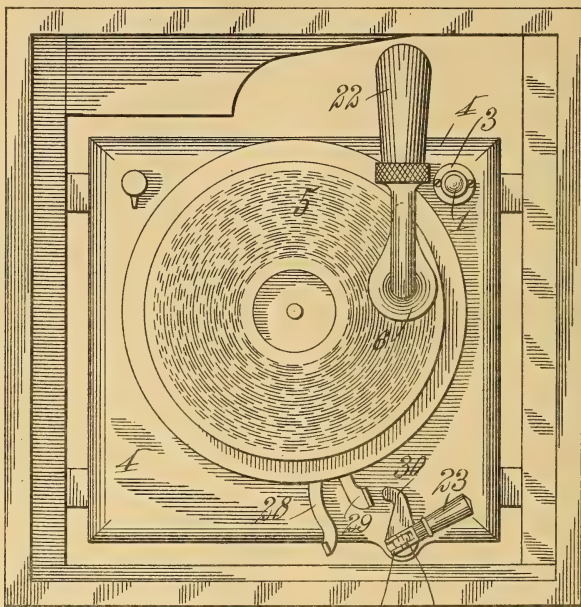


Fig. 1. 24 18

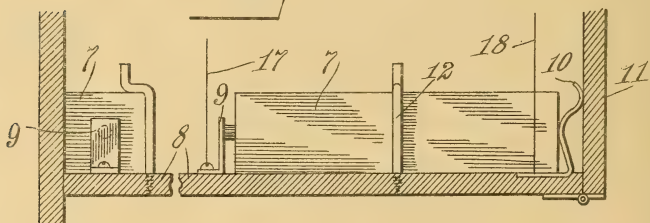


Fig. 6.

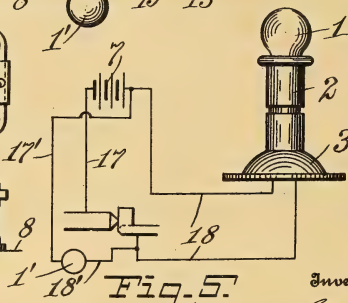
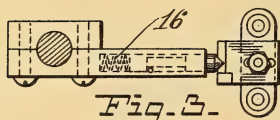
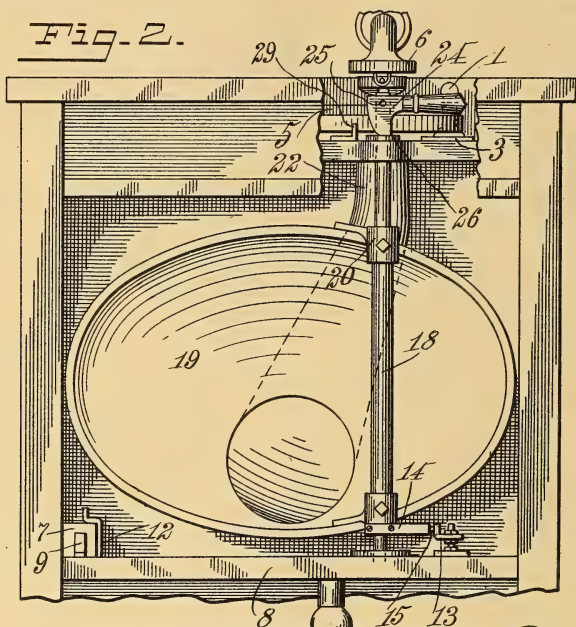
Fig. 7.

Witness
M. H. Gaba

Inventor
 Melvin H. Gaba.
 By *R. M. Carty*
 his Attorney

1,249,374.

2 SHEETS—SHEET 2.



Inventor

Melvin H. Gaba.

ਭੈਰਵ

J. M. Coarty
his

Attorney

Witness,

Witness
M. L. L. L.

UNITED STATES PATENT OFFICE.

MELVIN H. GABA, OF PHILADELPHIA, PENNSYLVANIA.

PHONOGRAPH ILLUMINATING APPLIANCE.

1,249,374.

Specification of Letters Patent.

Patented Dec. 11, 1917.

Application filed March 3, 1917. Serial No. 152,196.

To all whom it may concern:

Be it known that I, MELVIN H. GABA, citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Phonograph Illuminating Appliances; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention involves phonographs or talking machines and comprises an electrical light appliance. The special type of machine to which it is applicable is the Edison phonograph, but with some modification my invention may be applied to any of the existing forms of talking machines. In more specific terms, the invention consists of an electrical circuit, a battery and a switch or automatic circuit making and breaking device which is operated from the setting shaft of the machine, and incandescent lamps located in the top of the machine cabinet outside of the space occupied by the record disks also in the lower part of the cabinet to afford light for selecting records and changing same. The object of the invention is to provide means for illuminating the disks or records automatically at the time of starting the machine and simultaneously illuminating the record compartment. The illumination of the record disks when placed in position is for the purpose of protecting the records from injury due to scratching of the diamond point thereon when the latter is improperly manipulated when being placed in a starting position. Not infrequently machines are placed in illy lighted rooms or in a position remote from the light and it is difficult to see the record disks clearly in selecting them and placing them in position; and at other times it may be desirable to operate the machine at dusk or twilight before the lights are turned on for the evening, or in the dark. In such cases, for convenience in selecting the records and locating the reproducer point in the proper starting position, the record disk becomes illuminated as well as the record compartment. This is done automatically and the lights are shut

off when the stylus or diamond point is set. Preceding a more detailed description of my invention, reference in general terms is first made to the accompanying drawings, of which Figure 1 is a top plan view of a talking machine, the cover being removed to show the record disk in position. Fig. 2 is a front elevation of the upper portion of the machine with parts broken away. Figs. 3 and 4 are detail views of the switch or automatic circuit making and breaking device. Fig. 5 is a diagram of the circuits and lamps. Fig. 6 is a sectional view of a lower corner of the cabinet and the battery cells in end elevation. Fig. 7 is a side elevation of the batteries, the floor and side of the cabinet being in section.

In particularly describing my invention, similar reference characters will denote the same parts in the several views of the drawings. 1 and 1' designate comparatively small incandescent lamps, one of which is mounted in a socket post 2 having a base 3, and the other of which is mounted in the record compartment. The parts 1, 2 and 3 constitute what will be termed the upper lamp, which is secured to the supporting plate 4. The location of this lamp is shown in Fig. 1 to be at the rear right-hand corner of said supporting plate, just outside of the circumference of the record disk 5 and back of the reproducer 6. The lamp 1 is just high enough to illuminate the face of the record and is entirely out of the way. Lamp 1 is in a convenient place to illuminate the record compartment and is also out of the way. The batteries 7 are located in a convenient place as shown in Fig. 2 and are securely held upon the shelf 8 between a bracket 9, which forms one terminal thereof, and a spring 10 which forms the other terminal thereof. The spring 10 is engaged by the door 11 of the cabinet when the said door is closed and thus the battery is held against any shifting or displacement in moving the machine from place to place. The said battery is also held in position by an angular bracket 12 which is secured to the floor on one side of the battery and hooks over the top thereof. The circuits as shown in Fig. 5 are controlled by a switch or automatic circuit making and breaking device, consisting of a stationary contact member 13 which is secured on the floor 8 and is adjustable vertically and horizontally. The other member consists of an arm 14, which

carries a contact plunger or point 15. A spring 16 is seated in the arm 14 behind the plunger and exerts a pressure outwardly thereon which maintains said plunger 15 in a position to contact with the member 13 and make the circuits through the conductor wires 17 and 18 and 17' and 18' leading from the opposite sides of the batteries to the lamps. The arm 14 carrying the contact member 15 is movable vertically by being rigidly connected to the perpendicular setting shaft 18 of the Edison phonograph. The shaft 18 as is well known carries the phonograph horn 19 which is attached to collar brackets 20, and the reproducer 6 and tone arm 22. The control lever 23, which is another element of the machine, is attached to the upper end of the perpendicular shaft 18. The head 24 of this lever has its fulcrum on a pin 25 and engages a plate 26 secured to the plate 4. The perpendicular shaft 18 moves freely through an opening in the plate 4 when the control lever 23 is operated to elevate and lower the reproducer 6. From Fig. 2 it will be seen in what manner the operation of lighting the record and disks and record compartment takes place. The movable contact point 15 is elevated to contact with the stationary contact point 13 as shown in Fig. 2, the reproducer having been elevated to put in position a new record disk and to set said reproducer to the starting position. The act of lowering the reproducer 6 through the control lever 23 makes contact between the points 13 and 15 and completes the circuit, thereby illuminating the record disk and record compartment and enabling the reproducer to be correctly set. When the reproducer is lowered to bring the diamond point in proper position, the contact is broken and the illumination of the disk ceases and the machine is set in operation by a movement of the starting lever 28. 29 and 30 are the stop devices which are effective in stopping the machine at the completion of a rendition. The member 30 is fixed to the setting shaft 18 which is moved by the reproducer to bring it in the path of member 29. These features are well known parts of the Edison phonograph and require no further description.

Having described my invention, I claim:

1. The combination with the reproducer

mechanism of a phonograph, an electrical circuit including batteries, a lamp in said circuit, said lamp being located adjacent to the reproducer arm and adapted to illuminate the record disks, and a switch controlled by the reproducer mechanism whereby the record disks are illuminated to enable the reproducer arm to be correctly positioned at the starting.

2. In combination, the reproducer mechanism of a phonograph, an electrical circuit including the batteries thereof, a lamp in said circuit, and a switch controlling said circuit, said switch being controlled by the movement of said reproducer mechanism to make and break the circuit and thereby illuminate a record disk.

3. In an illuminating appliance for phonographs of the character specified, the combination with the reproducer mechanism, of a circuit including a source of electrical energy, a lamp in said circuit arranged to illuminate the record disks when the reproducer arm is being initially positioned, and a switch consisting of movable and immovable contact points actuated when the reproducer arm is being placed in the initial position whereby contact is made completing the circuit and the record disk is illuminated to enable the correct initial positioning of the reproducer arm, said circuit being broken to extinguish the light when the reproducer mechanism is being moved to the lower position and the movable contact point separated from the stationary contact point.

4. The combination with the reproducer mechanism of a phonograph, of electrical circuits including batteries, lamps in said circuits located in positions to illuminate the record disk compartment and the record disks when placed in starting position and removed, and circuit making and breaking devices actuated automatically by the reproducer mechanism to complete the circuits to illuminate said compartment and record disks and to break said circuits to extinguish the lights.

In testimony whereof I affix my signature, in presence of a witness,

MELVIN H. GABA.

Witness:

MATTHEW SIEBLER.

SOUND REPRODUCING MACHINE.

1,249,398 ----- W. F. & J. F. Hitchcock,
Patented Dec. 11, 1917.
Filed Nov. 27, 1914.

W. F. & J. F. HITCHCOCK.
SOUND REPRODUCING MACHINE.
APPLICATION FILED NOV. 27, 1914.

1,249,398.

Patented Dec. 11, 1917.
2 SHEETS—SHEET 1.

Fig. 1

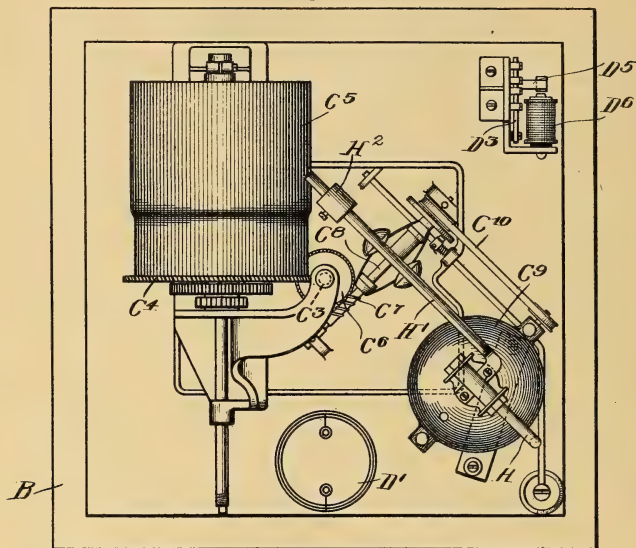
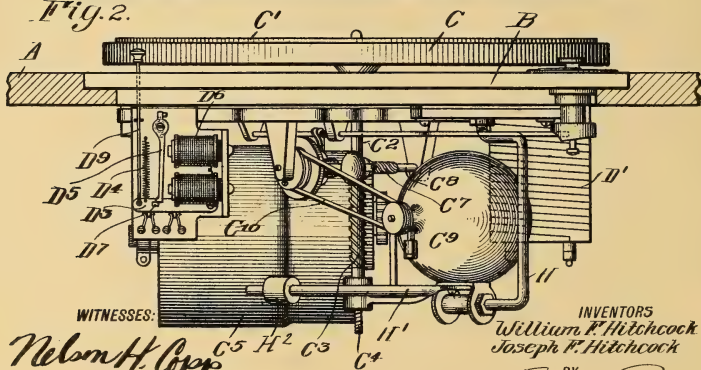


Fig. 2



WITNESSES:

Nelson H. Copp
Agnes Nesbitt Bissell

INVENTORS

William F. Hitchcock
Joseph F. Hitchcock

BY

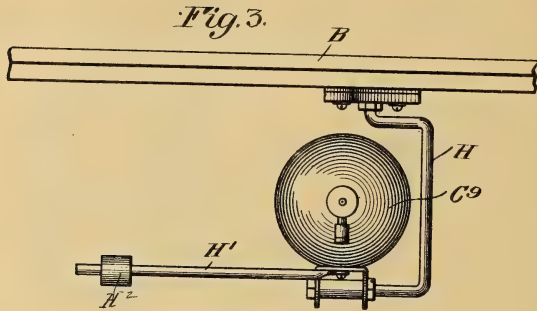
Shank & Rich
their ATTORNEYS

W. F. & J. F. HITCHCOCK.
SOUND REPRODUCING MACHINE.
APPLICATION FILED NOV. 27, 1914.

1,249,398.

Patented Dec. 11, 1917.

2 SHEETS—SHEET 2.



WITNESSES:

William H. Copp
Agnes Nesbit Bissell

INVENTORS

William F. Hitchcock
Joseph F. Hitchcock

BY

Charles C. Rich
their ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM F. HITCHCOCK AND JOSEPH F. HITCHCOCK, OF ROCHESTER, NEW YORK;
JOSEPH F. HITCHCOCK ASSIGNOR TO SAID WILLIAM F. HITCHCOCK.

SOUND-REPRODUCING MACHINE.

1,249,398.

Specification of Letters Patent.

Patented Dec. 11, 1917.

Application filed November 27, 1914. Serial No. 874,225.

To all whom it may concern:

Be it known that we, WILLIAM F. HITCHCOCK and JOSEPH F. HITCHCOCK, both of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sound-Reproducing Machines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

The invention has for its object to improve the construction of electrically driven sound reproducing machines by so mounting and arranging the motor as to reduce the noisy effect of the motor upon the music or sound produced by the instrument, and in this manner enriching the quality and tone of a record when played. A further purpose of the invention is to afford a motor attachment in the nature of a supplemental vibratory member, susceptible of vibration with relation to the motor, and which, when properly adjusted, serves to counteract or entirely eliminate the noise or hum of an electric motor, and thus free a sound reproducing instrument from all motor noise, so that the sound from the record may be rendered clearly and distinctly, without even the slightest interruption. To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a bottom plan view of the base with the mechanism attached, and showing the application of the invention in a preferred embodiment;

Fig. 2 is a side elevation of the parts, and

Fig. 3 is a side elevation of the motor, together with the carrier and the vibratory member mounted on the motor.

Similar reference characters in the several figures indicate the same parts.

In the embodiment of the invention shown herein, which illustrates a preferred manner of carrying out the several ideas constituting the subject matter of the present application, A designates the frame of the machine provided with a removable base or support B upon the underside of which is mounted the controlling mechanism of

the machine, as will be described more fully hereinafter. C designates the rotary table or member upon which a record C' may be positioned. The motor C^o is secured in a suitable manner to the base or support already mentioned, and in the present embodiment is shown mounted on an elongated carrier or arm H, which is in the form of a rod preferably of U-shaped formation, as shown in Fig. 3, one end being secured to the support B, while the motor is mounted on the opposite end. The conformation of the motor carrier or arm is such as to eliminate to some extent the hum or noise of the motor, due partially to the vibratory character of the carrier or arm, and in order to minimize the noise effects from the motor, we mount on the motor or, as in the present embodiment, on the motor carrier a vibratory member preferably in the form of a weight carried upon a rigidly connected rod or other suitable support. This member may be attached in various ways, and of different forms, but the best results have been accomplished by the structure of the present embodiment which consists of a rod H' secured to an extension on the motor casing, and preferably extending in a direction parallel to the plane containing the carrier or arm H, the rod H' being provided with a vibratory member in the form of an adjustable weight H². This construction makes it possible to employ an alternating current motor and obtain a practically noiseless operation, and under any conditions the noise of the motor is reduced to such an extent that it cannot be heard when the record is being reproduced. In some instances, the carrier or arm H may be dispensed with, and the motor fixedly mounted on the support or base instead of on a vibratory carrier, in which case the vibratory weight H² and rod H' act to eliminate the motor noise to the desired degree.

We claim as our invention:

1. The combination with a rotary member for imparting movement to a record of a sound reproducing machine, of an electric motor operatively connected with said member, a support or base for the motor, a rod, one end of which is fixedly connected to the motor and the other end of which is free to vibrate, and a vibratory member mounted upon the rod.

2. The combination with a rotary member

for imparting movement to a record of a sound reproducing machine, of an electric motor operatively connected with said member, and a weighted rod having a rigid connection with the motor, one end free to vibrate.

3. The combination with a base or support, of an angular carrier having one end rigidly attached to said support, an electric motor fixedly mounted on the free end of the carrier, and a vibratory member connected to the motor.

4. The combination with a base or support, of a carrier in the form of an angular rod having one end rigidly attached to said support, an electric motor fixedly mounted on the free end of the carrier, a second rod fixedly connected to the motor, and a vibratory member mounted on said rod.

5. The combination with a base or support, of an elongated carrier having one end fixedly mounted on the support, an electric motor fixedly attached to the free end of the carrier, and a vibratory member connected to the motor by a rigid support.

6. The combination with a base or support, of an elongated carrier having one end fixedly attached to the base, an electric motor fixedly mounted on the free end of the carrier, a rod fixedly connected at one end to the motor and a vibratory member mounted on said rod.

7. The combination with a base or support, of a vibratory carrier having one end fixedly mounted on said support and the opposite end free to vibrate, an electric motor fixedly attached to the free end of said carrier, and a rod fixedly mounted at one end with relation to the motor and carrying a vibratory weight adjustable with reference to the free end of the rod.

8. The combination with a base or support, of a vibratory angular carrier having one end rigidly attached to the support, an

electric motor fixedly mounted on the free end of the carrier, and a weighted arm rigidly connected to the motor and having one end free, acting to eliminate the hum of the electric motor.

9. The combination with an electric motor, of a vibratory member mounted upon a rod, one end of which is fixedly connected to the motor and the other end of which is free to vibrate.

10. The combination with an electric motor, of a rod having one end fixedly connected to the motor, and a weight adjustable on the rod with reference to its free end.

11. The combination with an electric motor, of a base or support for the motor, an angular carrier having one end attached to the support, the motor being mounted on the opposite end, a rod connected to the motor and extending in a direction parallel to the plane of the carrier, and a vibratory member mounted on said rod.

12. The combination with an electric motor, of a support or base for said motor, a carrier in the form of an arm having one end attached to the base, the motor being mounted on the opposite end of the carrier, a rod attached to the carrier and extending in a direction parallel to the plane thereof, and a vibratory member mounted on said rod.

13. The combination with an electric motor, of a support or base for the motor, an elongated arm attached to the base, the motor being mounted near the opposite end of said arm, a rod attached to the arm and extending in a direction parallel to the plane thereof, and a vibratory member mounted on said rod.

WILLIAM F. HITCHCOCK.
JOSEPH F. HITCHCOCK.

Witnesses:

RUSSELL B. GRIFFITH,
H. E. STONEBRAKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND TRANSMITTING APPARATUS.

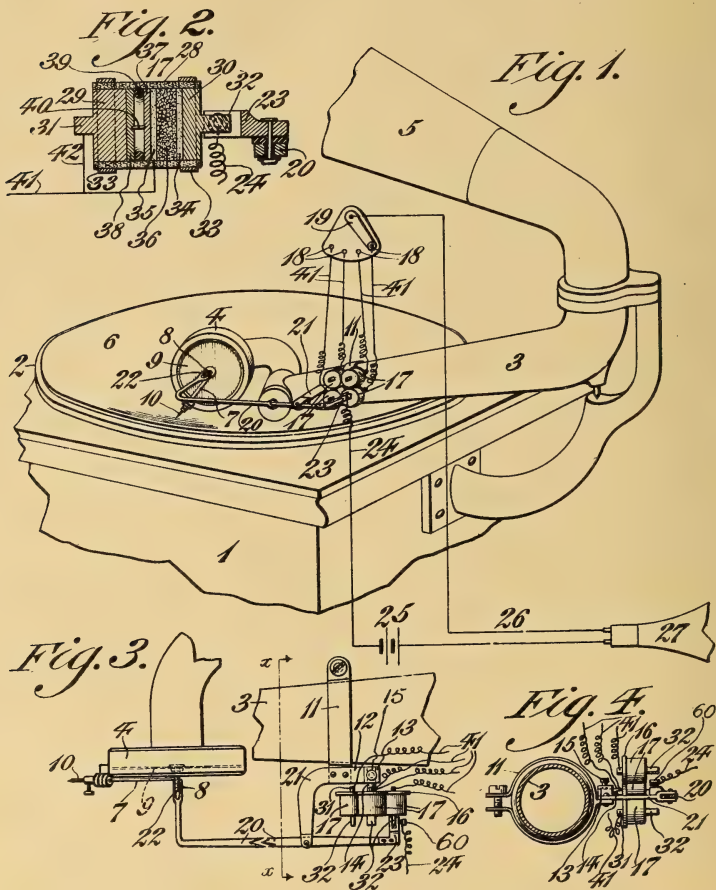
1,249,409 ----- A. D. Jones,
Patented Dec. 11, 1917.
Filed March 2, 1914.

A. D. JONES.
SOUND TRANSMITTING APPARATUS.
APPLICATION FILED MAR. 2, 1914.

1,249,409.

Patented Dec. 11, 1917.

2 SHEETS—SHEET 1.



WITNESSES

L. Howville,
O. F. Nagle.



alva S. Jones.
BY Niedersheim & Gantant
ATTORNEYS

INVENTOR

A. D. JONES.
SOUND TRANSMITTING APPARATUS.
APPLICATION FILED MAR. 2, 1914.

1,249,409.

Patented Dec. 11, 1917.

2 SHEETS—SHEET 2.

Fig. 7.

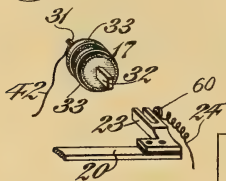
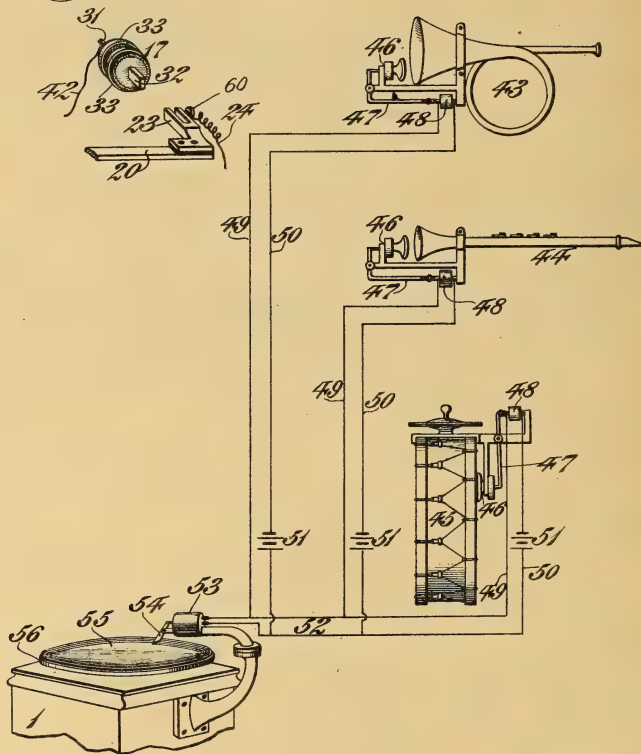


Fig. 6.



WITNESSES

L. Bouville,
P. F. Nagle.

INVENTOR

Alva S. Jones.
BY *Wiederholm & Gaubert*

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALVA D. JONES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF FORTY ONE-HUNDREDTHS TO FRANK LYSTER, OF PHILADELPHIA, PENNSYLVANIA.

SOUND-TRANSMITTING APPARATUS.

1,249,409.

Specification of Letters Patent.

Patented Dec. 11, 1917.

Application filed March 2, 1914. Serial No. 821,877.

To all whom it may concern:

Be it known that I, ALVA D. JONES, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Sound-Transmitting Apparatus, of which the following is a specification.

My invention consists of an apparatus adapted to be attached to and connected with a talking machine for transmitting sounds reproduced from a record by a sound-box in such machine to a distant receiver or sound-reproducing device.

It further consists of such apparatus in which the talking machine can emit the sounds at the same time they are distantly transmitted to another reproducing device.

It further consists of an improved variable resistance device or microphone for such apparatus.

It further consists of improved provisions for adapting the transmitting device to the varying tonal characteristics of the sounds reproduced from various records or other sources of sound.

It further consists of apparatus in which individual variable resistance devices or microphones are applied respectively to the individual sources of concerted sounds, such as to the individual instruments of a band or orchestra, each of such devices being adjusted to the tone-quality of its source or instrument, and the circuits from the several devices being connected to mains or trunks connected to a sound-recording device, recording the concerted current vibrations or undulations produced by the sound vibrations or undulations upon a blank similar to that in the ordinary sound-recording apparatus.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detailed construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings—

Figure 1 represents a perspective view of a portion of a talking machine equipped with my transmission apparatus, portions of the apparatus being illustrated diagrammatically.

Fig. 2 represents a section of the variable resistance device or microphone.

Fig. 3 represents a plan view of a portion of the tone-arm and of the sound-box of a talking machine, showing the resistance device and its connection to the diaphragm.

Fig. 4 represents a section on the line $x-x$ in Fig. 3.

Fig. 5 represents a perspective view of the support of the plurality of resistance devices employed.

Fig. 6 represents a diagrammatic view of the apparatus for individually conveying the individual sound-created current vibrations or undulations from the individual sources of sound to be concertedly recorded.

Fig. 7 represents a perspective detail view of one of the variable resistance devices and the end of the lever connected thereto.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, the reference numeral 1 indicates the casing of a talking machine of any preferred construction, having a rotatable turn-table, 2, and a movably supported tone-arm, 3, carrying a sound-box, 4, and communicating in any usual or desired manner with a horn, 5, or other sound-amplifier. The record, 6, of the usual disk-form rests upon the turn-table. A stylus-arm, 7, is supported upon the sound-box and connected at one end to a post or bolt, 8, secured through the center of the diaphragm, 9, of the sound-box, and the outer end of said stylus-arm carries the removable and changeable stylus, 10. All of these parts can be of any desired or suitable construction employed in the various types of talking machines.

A clamp, 11, is secured upon the tone-arm and has a bracket, 12, in a bearing, 13, of which a stud, 14, is rotatable and adjusted by a set-screw, 15, said stud projecting centrally from a spider-frame, 16. A number of variable resistance devices or microphones, 17, which will hereinafter be described in detail, are secured upon the branches of said spider-frame, and each of said devices has one terminal electrically connected by a conductor, 41, to one of a series of contacts, 18, of a switch device, the movable member, 19, of which can be moved to engage each of said contacts. A lever, 20 is fulcrumed upon a bracket, 21, projecting from the clamp upon the tone-arm, and has

an insulated clamp, 22, upon one bent end, clamping the end of the central post or bolt of the diaphragm of the sound-box, so that said lever will be vibrated in unison with the stylus-arm and diaphragm. The other arm of the lever has a bent end formed with a clamp, 23, which can engage a terminal of one of the resistance devices or microphones which is brought to register with the clamp by rotating and adjusting the spider-frame, and said clamp is insulated from the lever but in electric contact with the terminal of the resistance device and has a conductor, 24, of an electric circuit having a suitable source, 25, connected to it by a screw, 60. The other conductor, 26, of this circuit is electrically connected to the movable contact of the switch. A sound-producer, 27, the detail construction of which forms no part of the present invention is connected in the circuit to produce sound by the vibrations or undulations of the current in the circuit, and may be located at any distance from the talking machine.

The variable resistance device or microphone 17, four of which are illustrated, consists of a cylindrical jacket or casing, 28, of cloth or similar non-conducting yielding and inelastic material, and the ends of said casing are closed by two cylindrical heads, 29 and 30, of brass or similar electrically conducting material, having each a lug, 31 and 32, respectively, upon the outer side. Bands, 33, are preferably tightly drawn around the ends of the casing to secure it upon said heads. The lug 31 of the head 29 is rigidly secured in the branch of the spider, and the lug 32 of the head 30 can be engaged by the clamp 23 of the vibrating lever, so that said head can be vibrated from the vibrations of the lever. A disk, 34, of solid carbon and having its inner face smooth and highly polished, is secured in the casing to have the head 30 bear against its outer face.

A similar disk, 35, also of solid carbon and having the face opposed to the former disk highly polished, is secured in the casing and at a distance from said other disk to form a space in which is a filling, 36, of granular conducting material, such as carbon, metal or other material, the conductivity of which is varied by rest or disturbance of the granules, such filling or granular body forming a variable resistance or microphone body. A disk, 37, of tungsten or magnetized steel is secured in the casing to bear against the carbon-disk, and a disk, 38, of soft iron is secured in the casing and bears against the rigid head 29, and an annular gasket, 39, is interposed between the edges of said disks and is formed from rubber or similar material to form a yielding and resilient spacer between the disks. A wire, 40, of steel or iron electrically connects the disks. The granular filling or body of the several varia-

ble resistance or microphone devices is of different consistency, having granules of greater or less size, so that the resistances of said devices will be different and each device adapted to the character of the sounds or tones to be transmitted.

The conductor 41 of each device is connected to the inner carbon-disk, and a shunt-wire, 42, connects said conductor and the rigid head of the device, to form a shunt-circuit through said head and the magnetic disks 37 and 38.

In practice, the disk having the record to be transmitted is placed upon the turn-table, and the spider carrying the resistance devices or microphones is adjusted to bring the appropriate device to have its terminal lug engaged by the clamp of the vibrating lever. When the stylus is brought into contact with the groove in the record and the turn-table is started, the vibrations of the stylus and diaphragm will be communicated to the lever, which will communicate such vibrations to the movable head of the variable resistance device or microphone connected to the lever. Said vibrations will exert more or less disturbance in the granular body in the resistance device, thus varying the resistance in the circuit of the producing device and transmitting the sound vibrations or undulations of the diaphragm of the sound-box by corresponding vibrations or undulations in the electric circuit to the distant sound-producing instrument or receiver.

The circuit in the variable resistance device or microphone passes through the movable head, the outer carbon-disk, the granular body and the inner carbon-disk, and a shunted circuit passes through the magnetic steel disk, the soft iron disk and the head. The variations of the intensity of the circuit will vary the magnetization of the steel and iron disks and the degree of their attraction.

The resistance in each device is different from that in the others by the employment of larger and smaller granules or of granules of material differing in conductivity, so that a variable resistance device or microphone of greater or less resistance under varying disturbances may be employed according to the tonal character of the instrument or sound-generator being reproduced.

In Fig. 6 of the drawings is illustrated an apparatus for recording sounds in which my variable resistance device or microphone is employed. Musical instruments and other tone or sound-producing sources have different tonal characteristics which act differently upon diaphragms or other recording and reproducing devices, and in recording the concerted sounds from such sources, the sounds from one source are liable, on account of their characteristic influence upon the recorder, to interfere with the sounds

from other sources and thus destroy or disturb the concerted effect.

For the purpose of preventing such result, each source of sound or a number of sources having the same tonal characteristics are arranged to emit the sounds to a transmitter, the circuit of which is connected to a specially adapted variable resistance device or microphone having granular fillings of special material and size, as above described, and such circuits are connected in multiple to trunk-conductors leading to a recording device which produces the thus concerted vibrations upon one record.

In said figure, three instruments are illustrated, as examples, viz.—a horn, 43, a clarinet, 44, and a drum and cymbals, 45. A receiving sound-box, 46, is supported to receive the tones from each instrument, and has its diaphragm connected by a lever, 47, to a variable resistance device or microphone, 48, as in the hereinbefore described apparatus, such device being connected to the conductors, 49 and 50, of a circuit, having a source, 51, of electric current and connected to main-conductors, 52, the several branch-circuits being connected in multiple to such main-conductors. The main conductors are connected to a recording apparatus, 53, of any suitable or desired construction for transferring the current vibrations in the mains to a graver, 54, forming a record-groove in a blank, 55, supported upon a turntable, 56, such as usually employed in recorders for talking machines.

Where several instruments have the same or substantially the same tonal characteristics, they may be grouped to one receiving sound-box and microphone.

By thus transmitting the electric current vibrations of sounds from each source or group of sources through a microphone adjusted to the tonal-characteristics of the same, and concerting such modified vibrations to one recording apparatus, an even record which will produce an evenly concerted sound or tone in a reproducer will be made, in which shrill or otherwise disturbing sounds will be eliminated.

By the employment of the variable resistance device or microphone in an electric circuit transmitting vibrations or undulations in an electric current created by and corresponding to sound vibrations or undulations, such vibrations or undulations may be transmitted any distance and may be enlarged and intensified at the reproducing terminus of such circuit.

Other modes of applying the principle of

my invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism thus disclosed, provided the principles of construction set forth respectively in the following claims are employed.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In apparatus of the character stated, a variable resistance device or microphone, comprising a non-conducting casing, heads closing the opposite ends of said casing and formed from conducting material, carbon disks within said casing and one in contact with one of said heads, a body of granular conducting material between said disks, a permanent magnet and a soft-iron armature resiliently separated and electrically connected with each other and with a head and a carbon-disk, a sound transmitting device having a diaphragm, means for communicating the vibrations of said diaphragm to the head in contact with the outer carbon-plate, and an electric circuit having one conductor electrically connected to said last mentioned head and the other conductor electrically connected to the other head and to the inner carbon-plate.

2. In apparatus of the character stated, a sound transmitting device having a diaphragm, a lever fulcrumed to have the end of one arm connected to said diaphragm to vibrate with the same, a plurality of microphones movably mounted to each have its mechanically movable element mechanically connected to the other arm of said lever, an electric circuit having one conductor adapted to be electrically connected to any one of said microphones and the other conductor connected to the lever to form electrical connection with the microphone engaged by the same, and a sound-reproducing device in said circuit.

3. A device of the character stated, comprising a sound transmitting device having a diaphragm and a tone arm, a plurality of microphones mounted on said tone arm, an electric circuit connected with said microphones, a switch to place a predetermined microphone in circuit, means to mechanically connect a predetermined microphone with said diaphragm, and a sound reproducing device in said circuit.

ALVA D. JONES.

Witnesses:

WM. LECLUR,
C. D. McVAY.

PROCESS OF MAKING TALKING-MACHINE RECORDS.

UNITED STATES PATENT OFFICE.

JOHN KAISER, OF NEW YORK, N. Y.

PROCESS OF MAKING TALKING-MACHINE RECORDS.

1,249,414.

Specification of Letters Patent.

Patented Dec. 11, 1917.

No Drawing.

Application filed May 31, 1917. Serial No. 171,875.

To all whom it may concern:

Be it known that I, JOHN KAISER, a citizen of the United States, residing in the city of New York, county of New York, and State of New York, have invented an Improved Process of Making Talking-Machine Records, of which the following is a specification.

My invention relates to talking machine records and its object is to provide a superior record by an improved mode of operation, involving the production of an original record by electrolysis.

In the practice of my improvements in the preferred form and as heretofore carried out, I take a copper disk which I coat with a thin film of material, such as a composition of five parts of liquid asphaltum and one part of dragon's blood. The disk provided with this film, which has been permitted to become firm, is revolved in contact with a recorder having its diaphragm operated by sound vibrations, so that the stylus forms a laterally undulating spiral groove corresponding to the sound waves by the removal of a portion of the film from the disk. The disk provided with this record groove is then submerged in a copper sulfate solution and combined as an anode with a copper cathode submerged therewith. The solution is electrolyzed by means of a low voltage current with decomposition of the copper where exposed along the lateral undulating or zig-zag line and production in the copper disk of a fine laterally undulating or zig-zag groove corresponding to the sound waves. During the electrolytic action, the coated disk is preferably revolved in the bath for the purpose of producing a uniform and satisfactory groove. The desired record groove having been formed in the disk, it is removed from the bath and has the film or coating removed therefrom, suitably by washing with gasoline.

Electro-types are produced from this original record according to known processes, as by dipping in cyanid of potassium and silver nitrate solutions and electrolytically depositing copper to form a male or pressing record from which commercial records are produced by molding in the usual or any desired way.

While I have described a specific form of my invention, it will be understood that such

form is by way of illustration and not of limitation, since it is evident that the invention may be embodied variously, as by the use of cylinders instead of disks, and contemplates broadly the electrolytic production of a record groove corresponding to sound waves.

Having described my invention, I claim:

1. The process of making records which comprises coating a metal surface with a protecting film, forming in said film an undulating groove corresponding to sound waves with exposure of the metal at the bottom of said groove, and electrolytically decomposing the exposed metal with the production therein of an undulating groove corresponding to said sound waves.

2. The process of making records which comprises coating a metal disk with a protecting film, forming in said film a laterally undulating spiral groove corresponding to sound vibrations so as to correspondingly expose said metal, and electrolytically decomposing the exposed metal with production in said disk of a laterally undulating electrolyzed groove corresponding to said sound vibrations.

3. The process of making records which consists in coating a copper disk with a protecting film, forming a spiral groove having lateral undulations corresponding to sound vibrations in said film so as to correspondingly expose the surface of said disk, and electrolytically removing the exposed metal while moving said disk in electrolyte with production in said disk of a spiral groove having lateral undulations corresponding to said sound vibrations.

4. The process of making records which consists in coating a metal body with a protecting film, forming a spiral groove having lateral undulations corresponding to sound waves in said film so as to correspondingly expose the surface of said body, electrolytically removing by means of low voltage current exposed metal with production of a spiral groove having lateral undulations corresponding to said sound waves, electrolytically producing male molding forms from said record, and pressing records by means of said forms.

In testimony whereof I have hereunto set my name this 28th day of May, 1917.

JOHN KAISER.

CABINET FOR PHONOGRAPHS OR TALKING MACHINES.

1,349,646 ----- C. J. Lundstrom,

Patented Dec. 11, 1917.

Filed July 17, 1916.

C. J. LUNDSTROM.
CABINET FOR PHONOGRAPHS OR TALKING MACHINES.
APPLICATION FILED JULY 17, 1916.

1,249,646.

Patented Dec. 11, 1917.

Fig. 1.

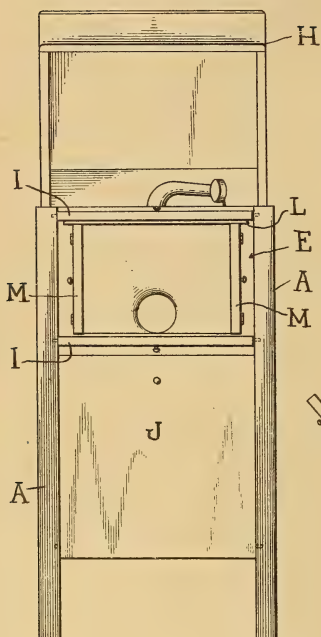


Fig. 2.

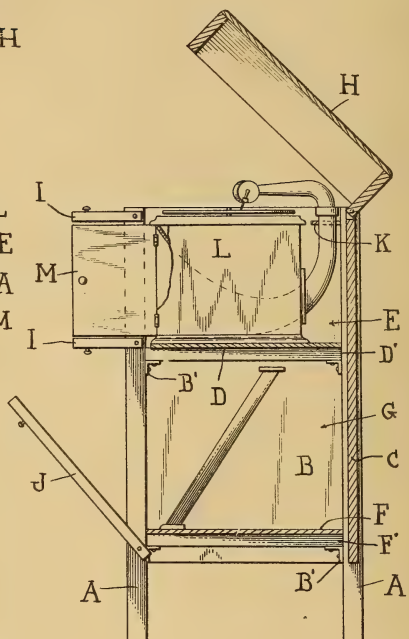
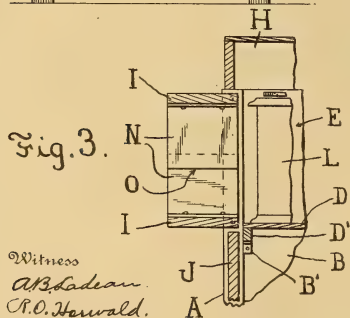
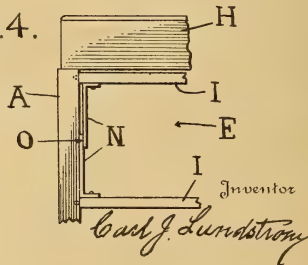


Fig. 3.



Witness
A. B. Sadeau.
R. O. Herwald.

Fig. 4.



Inventor
Carl J. Lundstrom

351

Attorney

UNITED STATES PATENT OFFICE.

CARL J. LUNDSTROM, OF LITTLE FALLS, NEW YORK.

CABINET FOR PHONOGRAPHS OR TALKING-MACHINES.

1.249,646.

Specification of Letters Patent.

Patented Dec. 11, 1917.

Application filed July 17, 1916. Serial No. 109,656.

To all whom it may concern:

Be it known that I, CARL J. LUNDSTROM, a citizen of the United States, residing at Little Falls, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Cabinets for Phonographs or Talking-Machines, of which the following is a specification.

This invention relates to cabinets for phonographs or talking machines.

One object of my invention resides in the provision of a cabinet particularly adapted for holding the small, open-type, portable talking machines.

Another object resides in the provision of a cabinet provided with an upper and lower compartment, the upper compartment adapted to receive any of the well known makes of small open type portable talking machines, whereby the appearance and advantages of the larger type cabinet machines can be obtained at a moderate cost.

A still further object resides in the means for extending the sound amplifier or horn whereby the sound volume of the machine may be increased.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions and minor details without departing from the spirit or sacrificing any of the advantages of the invention.

Figure 1 is a front elevation.

Fig. 2 is a side elevation partly in section.

Fig. 3 is a fragmentary vertical cross-section of a modified form.

Fig. 4 is a fragmentary front elevation of a modified form of cabinet doors.

Referring to the accompanying drawings, the cabinet consists of the four corner posts A, connected together to form a rectangular structure by means of the two side panels B and rear panel C. The side panels B are preferably secured to the corner posts A by means of angle-irons B' whereby the cabinet can be shipped in knock-down position.

A shelf D is suspended from the four corner posts at the upper part of the cabinet, thus forming a compartment E for the re-

ception of an open type portable talking machine L.

A second shelf F is suspended from the four corner posts at the lower part of the machine, thus forming a second compartment G for the reception of records. The two shelves D and F are supported by cleats D' and F' respectively, said cleats being secured to the corner posts A. The upper compartment E is closed at the top by means of a hinged cover H, while the front of the said compartment is provided with two pivoted doors I. The compartment G is closed by means of a pivoted door J. A removable board K is detachably secured in any manner desired to the inner walls of the compartment E for a purpose presently explained.

In Figs. 1 and 2 a practical embodiment of my invention is shown. In this figure a portable talking machine L provided with the usual pivoted doors M is shown located in the compartment E resting on the shelf D.

The parts of the talking machine are inserted through the top of the cabinet with the doors M closed. The removable board K is then secured in place, thus covering the space between the body of the machine and the rear wall of the cabinet and also securing the machine in place in the compartment E. At this point it will be noted that by opening the doors I of the cabinet and the doors M of the talking machine, a four wall inclosure is formed thus providing an extension of the sound amplifying chamber or horn and thereby increasing the volume of sound. By closing the cover H it will be seen that a structure is provided very closely resembling in appearance the larger type cabinet machines and one in which the advantages of the larger type cabinet machines can be obtained at a moderate cost.

When the cabinet is used in connection with the talking machines having an open or doorless front, the doors of the cabinet may be provided with sheet metal sides as shown at N in Figs. 3 and 4. By having these sheet metal sides overlap each other, as shown at O, they will not interfere with the opening and closing of the doors.

What I claim is:

1. In a talking machine cabinet, a casing provided with a compartment adapted to receive a portable talking machine provided with doors, said compartment having an

opening through which said doors are adapted to swing.

2. In a talking machine cabinet, a casing provided with a compartment adapted to receive a portable talking machine provided with a swinging door, said compartment having an opening through which said door is adapted to swing, and means for closing

said opening when the talking machine door is swung inwardly into the cabinet.

In testimony whereof I affix my signature in the presence of two witnesses.

CARL J. LUNDSTROM.

Witnesses:

ALBERT B. LADEAN,

RUDOLPH O. HORWALD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

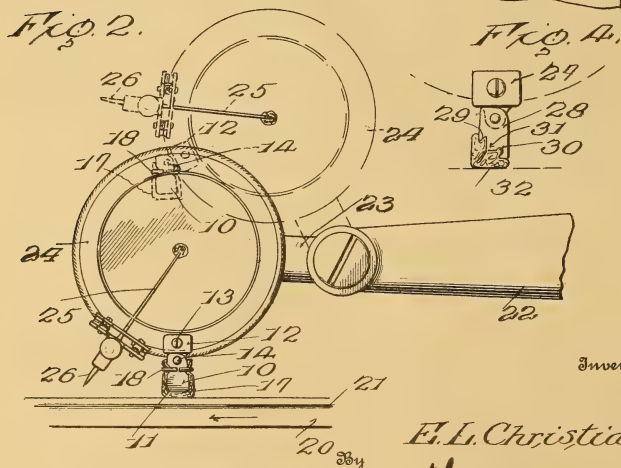
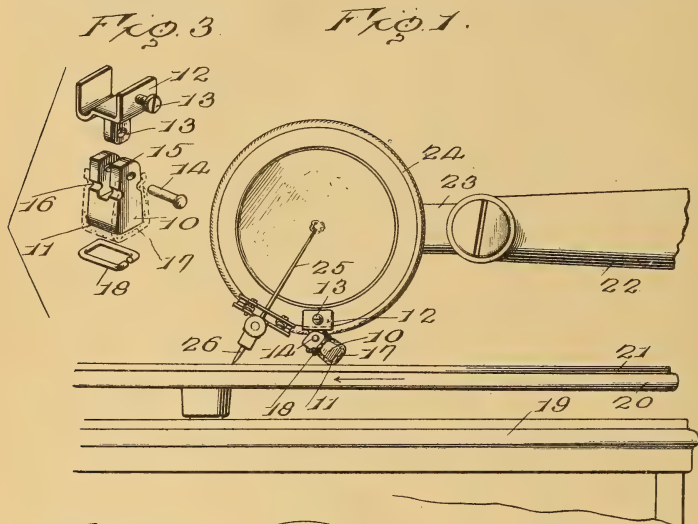
PHONOGRAPH RECORD CLEANER AND PROTECTOR.

1,249,720 ----- E. L. Christian.
Patented Dec. 11, 1917.
Filed May 22, 1917.

E. L. CHRISTIAN.
 PHONOGRAPH RECORD CLEANER AND PROTECTOR.
 APPLICATION FILED MAY 22, 1917.

1,249,720.

Patented Dec. 11, 1917.



Inventor

E. L. Christian
Christian Attorney

UNITED STATES PATENT OFFICE.

EDWARD LOOMIS CHRISTIAN, OF DOUGLAS, ARIZONA.

PHONOGRAPH-RECORD CLEANER AND PROTECTOR.

1,249,720.

Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed May 22, 1917. Serial No. 170,257.

To all whom it may concern:

Be it known that I, EDWARD L. CHRISTIAN, a citizen of the United States, residing at Douglas, in the county of Cochise and State of Arizona, have invented certain new and useful Improvements in Phonograph-Record Cleaners and Protectors, of which the following is a specification.

This invention relates to an improved record cleaner and protector for phonographs and has as its primary object to provide a device of this character which may be attached to the sound box of the phonograph in the rear of the stylus and automatically operable to engage the phonograph record upon the movement of the sound box toward the record for supporting the sound box in position with the needle spaced from the record to thus prevent the marring or scratching of the record by the accidental fall of the sound box.

The invention has as a further object to provide a construction wherein after the sound box has been moved to engage the protector with the record of the phonograph, the protector may then be swung to inactive position for permitting the movement of the sound box to engage the needle with the record.

And the invention has as a still further object to provide a construction wherein the protector when swung to inactive position will provide a cleaner or sweep for the record for removing the dust therefrom as the record is revolved beneath the needle of the phonograph.

Other and incidental objects will appear as the description proceeds and in the drawings wherein I have illustrated the preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a side elevation showing a portion of a conventional type of phonograph with the sound box thereof equipped with my improved protector, the protector being swung to inactive position to provide a cleaner for the phonograph record in the rear of the needle,

Fig. 2 is a similar view showing the protector in active position supporting the sound box with the needle of the phonograph spaced from the record, this view also illustrating in dotted lines the manner in which the body of the protector is adapted

to gravitate to active position upon the movement of the sound box to seat the phonograph needle upon the record,

Fig. 3 is a detail view showing the device detached with the parts thereof disconnected from each other, and

Fig. 4 is a detail side elevation showing a slightly modified form of the invention.

In carrying out the invention, my improved protector is formed with a body 10, the front lower corner of which is rounded off as indicated at 11. Swingly supporting the body is a substantially U-shaped attaching member or clamp 12 provided with a set screw 13 adjustable through one arm of the clamp. Projecting laterally from the bottom of the clamp is a hinge lug 13 loosely received in a suitable slot in the upper extremity of the body 10 and pivotally connecting the body with the clamp is a pivot pin 14 extending through the said lug. At the upper end of the body, the rear corner thereof is cut away or rounded off as shown at 15. The body is thus mounted to swing in one direction upon the clamp with the upper end of the body adapted to coast with the bottom of the clamp for locking the clamp in substantially vertical position against swinging movement beyond its pivotal center in the opposite direction. Formed in opposite sides of the body adjacent its upper extremity are oppositely disposed notches or grooves 16 and fitted around the lower end of the body is a shoe or cleaning element 17 extending above the said grooves. The cleaning element 17 may be formed of suitable fabric such as velvet or plush and detachably connecting the said element with the body is a split resilient clip 18 extending around the body to fit within the said grooves and yieldably engage over the upper extremity of the cleaning element. While I have indicated that the cleaning element 17 is preferably formed of fabric still, I do not wish to be limited to this particular construction and the term cleaning element as herein used is accordingly intended to be construed in its broadest sense so as to include a brush. However, the said element should be of such nature as to in effect form a cushion upon the lower end of the body 10.

In order that the construction, mounting and operation of my improved protector may be accurately understood I have, in the drawings, shown the device in connection with a conventional type of phonograph

19 having the usual rotatable table 20 upon which is mounted the record 21. Extending over the table is a swinging amplifying horn 22 to the outer end of which is loosely connected a goose-neck 23 having a sound box 24 secured thereto. Connected with the diaphragm of the sound box is the pivoted stylus bar 25 which, at its outer end, carries a needle 26 for engagement with the record 21. As will now be observed, the clamp 12 is formed to fit around the casing of the sound box 24 in the rear of the stylus bar 25 and is detachably connected to the said sound box by the set screw 13 with the body 10 adapted to assume a vertical position when the sound box is swung forwardly upon the horn 22. As is well known, the sound box is, when in inactive position, rested against the tone arm so that when swinging the said sound box forwardly toward the record 21, the body 10 of the protector will, as shown in dotted lines in Fig. 2, normally gravitate upon the clamp 12 to assume a vertical active position projecting below the lower end of the needle. Since the body 10 of the protector is formed to co-operate with the clamp 12 for locking the body against forward pivotal movement upon the clamp, rotation of the record 21 with the table 20 cannot act to displace the body so that the body will thus engage with the record to support the sound box in position with the needle spaced from the record. Consequently, should the sound box be accidentally allowed to fall, my improved protector will therefore automatically operate to prevent the contact of the needle with the record with the cleaning element 17 acting as a cushion beneath the body 10 for preventing the marring or scratching of the record. Moreover, it will be observed that the protector will prevent the needle from scratching the record should the sound box be swung across the record with the horn 22. After the sound box has been moved to engage the protector with the record of the phonograph, as shown in Fig. 2, the body 10 of the protector may then be manually swung rearwardly when the sound box may, as illustrated in Fig. 1, be lowered to engage the needle 26 with the record. In this latter position of the body 10, the said body will ride upon the record in the rear of the needle 26 as the record revolves so that the cleaning element 17 will act to clean the record of any dust or other foreign matter thereon before coming in contact with the needle. In this connection, it will be observed that with the body 10 swung, as illustrated in Fig. 1, the rounded corner 11 of the body will be presented to the record and in being so rounded will not tend to cut through the cleaning element 17. However, when one cleaning element becomes worn

out, another may be readily substituted 65 therefor by simply removing the clip 18.

It will therefore be seen that I provide a particularly simple and efficient construction for the purpose set forth and a device adapted for attachment to substantially any 70 conventional type of phonograph. Furthermore, the device is so attached to the phonograph sound box that the presence of the device upon the said box will not result to the detriment of the tone reproducing qualities thereof. 75

In Fig. 4 of the drawings, I have illustrated a slight modification of the invention which relates more particularly to the mounting of the cleaning element. In this 80 modification, the attaching clamp of the device is indicated at 27 and swingingly connected to the said clamp is a body 28. The clamp 27 is identical with the clamp of the preferred form of the invention and the 85 body 28 is mounted in a similar manner. At its lower extremity, the body 28 is formed to provide an undercut channel 29 upon the forward side thereof and a similarly undercut channel 30 upon the lower end of the 90 body with an angle 31 between the said channels at the forward lower corner of the body. Fitted around the body is a cleaning element 32 of felt, cloth, or other approved material. This cleaning element is slit 95 transversely intermediate the ends thereof and is formed at its ends to fit within the channels 29 and 30 with the intermediate portion of the said element bent around the angle 31 of the body. In this position, the 100 cleaning element may be glued in place with the channels 29 and 30 acting to effectually secure the cleaning element upon the body. This provides a very simple means of mounting the cleaning element and since the operation of this modification of the invention is identical with the preferred form of the invention, a further description thereof will not be given.

Having thus described the invention, what 110 is claimed as new is:

1. The combination with a phonograph sound box including a stylus bar and a needle carried by the stylus bar, of a record protector carried by the sound box, the said 115 protector including a body, and an attaching member pivotally supporting the body and engaged with the sound box, the body being adapted to normally gravitate to a position projecting below the needle coacting at its inner extremity with the attaching member for holding the body against forward pivotal movement upon the said member. 120

2. A record protector for phonographs including a body, and an attaching member 125 pivotally supporting the body, the body being mounted to swing upon the said mem-

ber in a direction opposite to the rotary movement of the record and being limited in its swinging movement in a direction with the movement of the record.

5 3. A record protector for phonographs including a body, an attaching member swing-
ingly supporting the body, and shoulders
formed on the body to coact with the said
member for limiting the body in its swing-
10 ing movement upon the member in a direc-
tion with the rotary movement of the record
to support the body in active vertical posi-
tion.

15 4. A record protector for phonographs including a body, an attaching member piv-
otally supporting the body, the body being
mounted to swing in one direction upon the
said member, and a cleaning element carried
by the body, the said cleaning element pro-

viding a cushion arranged to contact with 20
the record.

5. A combined protector and cleaner for
phonograph records including a body, an
attaching member supporting the body to
normally gravitate in a direction with the 25
rotary movement of the record to locked
active position, and a cleaning element car-
ried by the body for sweeping the record
in the inactive position of the body.

6. A record protector for phonographs in- 30
cluding a body, an attaching member piv-
otally supporting the body, a cleaning ele-
ment extending around the lower end of the
body, and a clip detachably connecting the
said element with the body. 35

In testimony whereof I affix my signature.

EDWARD LOOMIS CHRISTIAN. [L. s.]

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Washington, D. C."

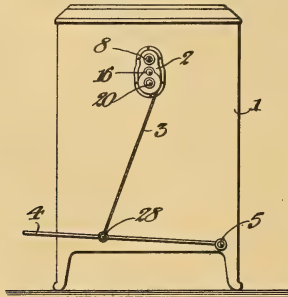
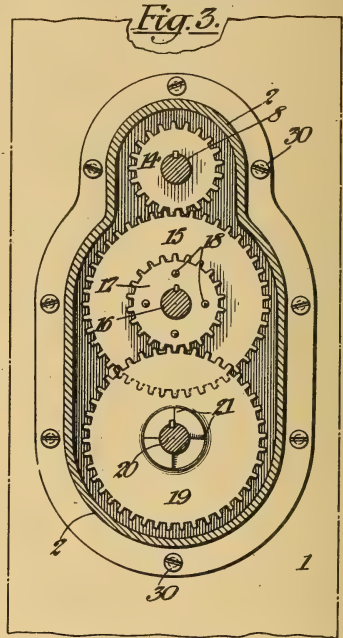
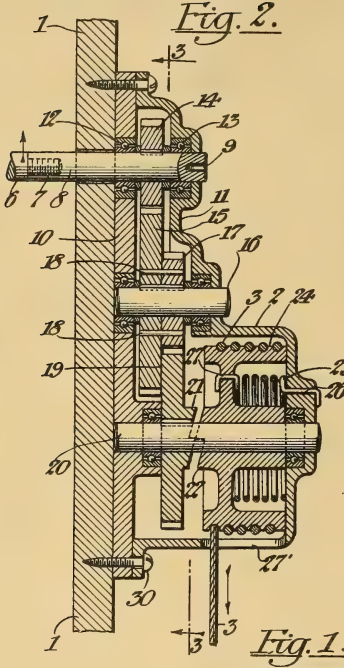
. RAPID WINDER FOR VICTROLAS, etc.

1,249,775 ----- B. G. Kramer,
Patented Dec. 11, 1917.
Filed Apr. 22, 1918.

B. G. KRAMER.
RAPID WINDER FOR VICTROLAS, &c.
APPLICATION FILED APR. 22, 1916.

1,249,775.

Patented Dec. 11, 1917.



Witness:
Wm. K. Kline

Inventor
Benjamin G. Kramer
By *Geo. H. Kline* Attorney
George H. Kline

UNITED STATES PATENT OFFICE.

BENJAMIN G. KRAMER, OF ANDERSON, INDIANA.

RAPID WINDER FOR VICTROLAS, &c.

1,249,775.

Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed April 22, 1916. Serial No. 92,834.

To all whom it may concern:

Be it known that I, BENJAMIN G. KRAMER, a citizen of the United States, and resident of Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Rapid Winders for Victrolas, &c., of which the following is a specification.

My present invention comprises means whereby a victrola or similar instrument may be wound by one or two strokes of a pivoted member, preferably a pedal. In the preferred embodiment, it is adapted for ready attachment to a victrola, in place of, and as a substitute for the usual hand crank customarily provided for winding purposes.

Many turns of the ordinary hand crank are required to wind the ordinary victrola, say 20 to 30. In order to perform this function by one or two reciprocations, in accordance with my present invention, I employ revolution-reducing gearing with corresponding multiplication of the power required to operate it and I proportion the ratio of the reducing gear, so that the power and length of stroke conveniently attainable by the pedal are coordinated to the number of revolutions and the spring resistance of the winding shaft.

I accomplish this by having the gearing reduce the winding shaft motion from say 20 revolutions down to say, five revolutions at the power shaft and give the latter its required number of revolutions through a winding drum and cord connected to the pedal.

I prefer to reduce from 20 to about 10 revolutions on the first pair of gears, then from 10 to about 5 revolutions on a second pair of gears, and then give the latter its 5 revolutions by unwinding 5 turns of cord on a winding drum of about the same diameter as the gear driven thereby. By such arrangement the strain on the drum shaft is only one fifth what it would be with a gear train ratio adapted to reduce the revolutions from 20 down to 1. Moreover, the strain is greatest on pinion shaft, which can be made the shortest, and least on the drum shaft, must be relatively long.

By arranging the reducing gears as a train, having their axes in the same straight line, the inclosing case will have a long base of attachment to the victrola case, in the line of draft of the pedal operated cord and

hence the gear case will be less likely to be torn loose.

With reducing gear of the above ratio a winding drum with say 5 turns of cord may be provided without bringing the line of draft of the cord too far away from the plane of attachment of the gear case to the victrola. Moreover, the drum may be made of considerable diameter without necessitating a pedal throw greater than would be convenient for the operator.

The winding drum is preferably shiftable on its shaft and provided with a coil spring which performs the double function of pushing endwise to throw the ratchet into driving engagement with the gear train and also of twisting and untwisting circumferentially to permit unwinding of the drum by pedal draft on the cord, and re-winding of the cord and retracting of the pedal when the pressure on the latter is removed.

I thus provide a device in which the permissible amplitude of pedal stroke is utilized effectively in that the strain on the cord is not too great and is applied near the plane of the base of the casing, and the strain is effectively resisted by the long base of the latter.

It will be noted that, theoretically at least, the same function could be performed by a winding drum having 20 turns, mounted directly on an extension of the winding shaft, but such winding drum would have 4 times the number of turns found in my winding drum, would be necessarily 4 times as wide and project 4 times as far from the side of the case. Moreover in order to give 20 turns of the winding shaft, with the same stroke of pedal, the diameter of the drum would have to be one quarter the diameter of my drum, and, necessarily the transverse strain would be four times as great.

The above and other features and advantages of my invention will be more fully understood from the following description in connection with the accompanying drawings, in which—

Figure 1 is an end elevation of a victrola showing my invention applied thereto.

Fig. 2 is a vertical sectional view in the vertical plane of the reducing gear, and

Fig. 3 is a face view of the reducing gear on the line 3—3 of Fig. 2.

The cabinet 1 contains the phonograph, talking machine or similar device provided with a spring motor which is to be periodically rewound. The casing 2 contains the

reducing gear and means for operating it through the cord 3, which is adapted to be pulled by depressing the pedal 4, pivoted at 5.

The winding shaft 6 within the cabinet 1 is provided with the usual reduced screw threaded stud 7 upon which it is now customary to screw the ordinary winding crank. My attachment includes a shaft 8 having a screw threaded recess of the same size and pitch as the threads of the stud 7 whereby it is adapted to be screwed on to the latter. The other end of the shaft 8 projects through the case 2 and is provided with a slot 9 or equivalent recess adapted to be engaged by a screw driver or similar device for screwing said shaft tightly upon the stud 7. The shaft 8 is supported in a closed casing comprising the base plate 10 and a cover plate 2 by means of ball bearings 12 and 13.

The shaft carries a gear pinion 14 meshing with gear 15 on shaft 16. A pinion 17 is rigidly secured to the gear 15 by a suitable means such as pins 18. This pinion meshes with gear 19 on shaft 20. All of these gears are preferably keyed to their respective shafts as indicated. The shafts are located in the same straight line so that the base plate 10 bears upon the casing 1 over an area which is considerably longer than its width. Moreover, the transverse driving stress on 15 and 17 are equal and substantially opposite, so that they are practically balanced on shaft 16. The gear 19 is provided with a face ratchet 21 engaged by an endwise movable ratchet 22 which is normally spring pressed toward it by spiral spring 23. The ratchet referred to is integral with the winding drum 24 on which is wound a cord, wire or other flexible draft member 3. The spring 23 in addition to its function of continuously pressing the ratchet 22 into engagement with 21 is adapted to automatically rewind the drum, its ends 26, 27 being secured, respectively, to the stationary cover 2, and to the rotary winding drum 24.

The cord is led out of the casing through slot 27 and is secured to the foot lever 4 as at 28.

In operation, the parts being in the position shown in Fig. 2, the pedal is depressed and pulls cord 3 which rotates drum 24. The latter being continuously pressed toward the ratchet 21, by spring 23 drives gear 19. This in turn drives pinion 18, gear 15, pinion 14 and shaft 8. Upon release of pressure on the pedal, the spring 23 which has been wound up by unwinding of the cord 3 rotates the drum 24 in the reverse direction rewinding the cord 3 and lifting the pedal 4.

The shaft 8 and the gear train connected thereto remain stationary during this rewinding operation, being held by the ordinary detent mechanism associated with winding shaft 6, within the victrola.

By inspection of the ratio of teeth on pinion 14, gear 15, pinion 17 and gear 19, it will be seen that the rotation reducing ratio is 4 to 1, so that shaft 8 revolves 4 times for one revolution of shaft 20. As there are 5 turns of the cord 3 on drum 24 the complete unwinding of the cord by one depression of the pedal will revolve the shaft 8, 20 times. In practice, I find this to be about the most convenient ratio because even where it requires 30 or more turns of shaft 8 for complete rewinding, it seldom takes as many as 20 turns to wind enough for the playing of one record of maximum length. Hence a single depression of the pedal upon change of the record will be sufficient for ordinary purposes and even if the device does become fully unwound, it can be restored by less than two full strokes of the pedal.

When the device is to be applied to an ordinary victrola provided with the usual winding crank, the crank is unscrewed, shaft 8 is inserted and screwed on to the stud 7 by a screw-driver or other implement engaging the other end of the shaft at 9. The casing is then screwed to the cabinet by screws 30 and the pedal by pivot 5.

It will be obvious that certain departures from the precise ratios above described will be within the spirit of my invention, but for victrola winding it will be found that the revolution-reducing should be one-half to seven-eighths completed by the gearing and that the winding drum or equivalent should have, say three to six revolutions for a single down stroke of the pedal or its equivalent.

Certain features of the general organization, as well as of the mechanical construction of my device, are entirely independent of the revolution reducing ratios, and of the number of elements by which the revolution reduction is accomplished.

I claim:

1. A winding attachment for victrolas comprising a casing, a shaft projecting through both sides of said casing, said shaft being provided at one end with a screw threaded recess adapted to fit a standard thread of a victrola winding shaft and the other end formed for engagement with a rotating tool, means for rotating said shaft comprising reducing gearing, a winding drum and a one-way driving connection between said winding drum and reducing gear, a cord wound upon said drum and automatic means for causing reverse rotation of said drum to rewind said cord.

2. A rewinding attachment for spring motor-operated instruments, comprising a

casing adapted to be secured to the instrument, a plurality of parallel shafts journaled in said casing, means for securing one of said shafts to the motor winding shaft of the instrument, multiplying gearing for transmitting power to said shaft from another of said shafts, a drum on said last mentioned shaft, one-way acting clutch connections between said drum and said gearing, a cord wound on said drum, a lever connected to said cord for rotating said drum to turn the motor winding shaft through said clutch and gearing, and a spring normally tending to wind up said cord and to hold said clutch connections in operative engagement but permitting slipping during the rewinding of the cord.

3. A rewinding attachment for spring motor-operated instruments, including a shaft adapted to be secured to the motor winding shaft, a second shaft, multiplying gearing between said shafts, a drum mounted on said second mentioned shaft and axially movable in respect thereto, clutch connections between said drum and said gearing, a cord wound on said drum and adapted to rotate the latter in one direction when pulled, and a spring acting to rotate said drum in the opposite direction to rewind the cord and tending to move said drum axially to hold said clutch connections in operative position.

4. A rewinding attachment for spring motor-operated instruments, including a casing adapted to be secured to the case of

the instrument, a shaft adapted to be attached to the winding shaft of the instrument and journaled in opposite walls of said casing, a pinion thereon, a second shaft journaled in the opposite walls of said casing and having a gear meshing with said pinion and a pinion rigid with said gear, a third shaft also journaled in the opposite walls of said casing and having a gear meshing with said last mentioned pinion, a drum on said last mentioned shaft and rotatable in respect thereto, a cord on said drum adapted to rotate the latter when pulled, and automatically acting one-way clutch connections between said drum and said last mentioned gear.

5. In combination, a spring motor-operated musical instrument having a case, a gear casing secured thereto, multiplying gearing within said casing, a drum within said casing, a lever pivotally mounted on said case independent of said casing, a cord wound on said drum and connected to said lever, whereby upon the movement of said lever in one direction said drum is rotated, a spring for rotating said drum in the opposite direction, and one-way automatically-acting clutch connections between said drum and said gearing.

Signed at Anderson, in the county of Madison and State of Indiana, this 19th day of April, A. D. 1916.

BENJAMIN G. KRAMER.

Witness:

HERBERT I. STOUT.

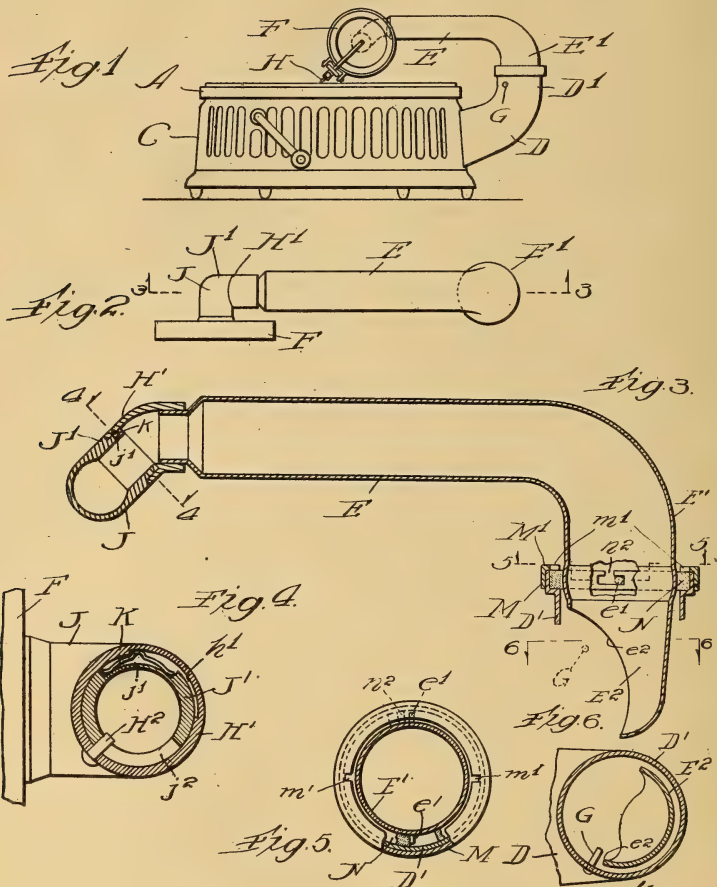
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,249,791 ----- L. McArthur,
Patented Dec. 11, 1917.
Filed Nov. 24, 1916.

1,249,791.

Patented Dec. 11, 1917.



Witness:
Ed. Plumtree

Inventor:
 Leslie M. Arthur.
 by Burton Burton
 his Atty

UNITED STATES PATENT OFFICE.

LESLIE McARTHUR, OF KENILWORTH, ILLINOIS, ASSIGNOR TO STEWART PHONOGRAPH CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH.

1,249,791.

Specification of Letters Patent.

Patented Dec. 11, 1917.

Application filed November 24, 1916. Serial No. 133,139.

To all whom it may concern:

Be it known that I, LESLIE McARTHUR, a subject of the King of Great Britain, residing at Kenilworth, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonographs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 The purpose of this invention is to provide an improved construction in several details of a phonograph, or talking machine, so-called. It consists in the features and elements of construction shown and described, as indicated in the claims:

In the drawings:—

Figure 1 is a side elevation of a phonograph embodying the features of this invention.

20 Fig. 2 is a plan view of a tone arm and sound box.

Fig. 3 is a section at the line, 3—3, on Fig. 2.

25 on Fig. 4 is a detail section at the line, 4—4, on Fig. 3.

Fig. 5 is a detail section at the line, 5—5, on Fig. 3.

Fig. 6 is a section at the line, 6—6, on Fig. 3.

30 The phonograph shown in the drawings is in general, of a familiar type, comprising the usual record carrier, A, with motor for actuating it, not shown, being inclosed within the support or frame structure, C, upon which is mounted the bracket, D, which constitutes a fixed portion of the sound conduit to whose vertically-extended and positioned upper portion, D¹, the tone arm, E, is connected for swinging horizontally to carry the 35 reproducer, F, over the record in the usual manner of this class of devices.

The reproducer or sound box, F, carrying the stylus, H, is connected to the tone arm by means of an elbow on the tone arm, having an obliquely-extending arm, H¹, which is inter-telescoped with an obliquely-extending arm, J¹, of the elbow, J, rigid with the sound box. The inclined elbow arms, H¹ and J¹, are mounted upon each other for relative rotation about their common axis, constituting a swivel connection between the tone arm and the sound box about whose axis the sound box may be adjusted from a position at which the stylus may cooperate 55 with a record of the "zig-zag" type, to a po-

sition at which it may cooperate properly with a record of the "hill-and-valley" type. For the purpose of rendering this joint snug and adapted to cause the sound box to remain safely at either position to which it is adapted, and at the same time rendering said adjustment reasonably easy, the inter-telescoped parts at this joint,—said arms, H¹ and J¹,—are provided with recesses, h¹ and j¹, at their inter-telescoped area, said recesses opening into each other and accommodating a bow-spring, K, having its middle part engaged in the recess in one of said members and its ends in the recess in the other member, and thereby reacting between the two members for holding the joint snug and providing a frictional resistance to the relative rotation of said members. The recesses, h¹ and j¹, are circumferentially extended so that the aggregate amount of play of the spring lodged therein circumferentially of the inter-telescoped members is the amount of the annular adjustment of the two members upon each other which is made for shifting the sound box from one of said operative positions to the other; and the spring thereby, together with the recesses in which it is lodged, constitutes the means for limiting this adjusting movement of the sound box. This spring being a flat spring, and the recesses in which it is lodged being channels in the respective members whose width is substantially that of the flat spring, said spring when engaged in the channels of the two members constitutes a key for retaining the two members together. It is understood that the two members will be engaged with the key spring therein by first placing the spring in the recess in the inner member, its ends being lodged in said recess, and compressing the middle point or bow to admit it into the other of said members, H¹, whereupon the two members being longitudinally telescoped to their stop shoulders, the recesses, h¹ and j¹, being thereby registered with each other, the bow of the spring will snap into the recess, h¹, and the members will be locked together. That they cannot be disengaged is not an objection. In case of breakage of the spring, it will be preferable to substitute an entire new joint rather than to undertake repairs. It may be considered desirable to provide for the locking together of the two inter-telescoped

members, H^1 and J^1 , and for limiting their relative rotation, not at one side only as by the spring above described, but at the opposite side also, and for that purpose the more familiar expedient may be employed, consisting of a pin, H^2 , inserted from the outside, through the outer of said members after they are inter-telescoped with each other, engaging a circumferentially-extending slot, J^2 , in the inner of said members, the extent of the slot being that of the annular adjustment of said members which is to be provided for.

The tone arm, E , for the purpose of good acoustic effect is desirably made as shown, comprising in one piece the reach from (but not including) the elbows which effect its connection with the sound box extending over the record to the pivoted end of the tone arm, and the elbow, E^1 , at said pivoted end, which extends down into the vertically-positioned member of the sound conduit, consisting of the upwardly-projecting arm, D^1 , of the bracket, D . This tone arm is not only integral throughout the entire extent, but of substantially uniform thickness throughout, as indicated by the sectional views thereof seen in the drawings; and this feature,—substantial uniformity of thickness, as well as integrality,—is found important in producing the desired effects upon the tone.

For pivoting the tone arm to the vertically-positioned member of the sound conduit for swinging of the tone arm and the sound box over the record, and for the vertical movement of the tone arm necessary to withdraw the stylus from the record, the vertically-positioned terminal member, D^1 , of the bracket, D , is provided at its upper end with an interiorly-flanged collar, M , whose flange, M^1 , forms with the upper end of the bracket arm, D^1 , an annular inwardly-opening channel around the sound conduit. The flange, M^1 , has diametrically opposite notches, m^1 , and there is lodged in this channel, m^2 , a packing ring, N , of suitably soft and tough material to constitute a cushion between the tone arm and the said sound conduit member, D^1 , the tone arm having the downwardly-extending elbow arm, E^1 , of such outer diameter as to fit snugly within the packing ring, N , and having opposite gudgeons, e^1 , e^2 , which enter through the notches m^1 of the flange, M^1 , of the collar, M , and lodge upon and engage with the packing ring, N , so that said packing ring becomes interposed between the metal of the gudgeons and the metal of the fixed member of the sound conduit, D^1 , and prevents not only the communication of vibrations from one member to the other, but also prevents any rubbing of the gudgeons upon the metal which would tend to produce vibrations which might interfere with

the tone delivered through the tone arm from the reproducer or sound box. Preferably, in order to insure that the packing ring turns around in the seat provided for it, instead of having the gudgeons of the tone arm ride around upon said packing ring, the packing ring is provided with notches, n^2 , for engagement of the gudgeons; and in order that the gudgeons may be protected from contact, not only with the lower metal wall of the channel, m^2 , which is formed by the upper end of the sound conduit member, D^1 , but also from the upper metal wall of said recess which is formed by the flange, M^1 . The notches, n^2 , are undercut, as seen in Fig. 3, so that the gudgeons entering the notches and the tone arm being then turned slightly, the gudgeons enter into the undercut portion of the notch and are thereby guarded from contact with the flange, M^1 .

In order to prevent the tone arm from being swung across the record to the injury of the latter by the stylus when the stylus runs out of the sound groove of the record at the end of the course of the latter, there is provided a check pin, G , jutting into the sound conduit member, D^1 , in a position for being encountered by the edge, e^2 , of the lower laterally cut away terminal portion, E^2 , of the tone arm, E , at the position of the tone arm which is reached when the stylus has completed its travel in the sound groove of the record. The terminal, E^2 , being laterally cut away through about 180 degrees of its circumference for discharge of the sound through the remainder of the sound conduit, the pin, G , allows the tone arm a swing of at least 180 degrees, which is ample for all purposes.

I claim:—

1. In a phonograph, in combination with a tone arm pivoted for swinging over the record, having at its pivoted end a downwardly-turned elbow; a vertically-positioned sound conduit member into which said elbow arm extends; a collar at the top of said conduit having an in-turned flange forming an internal annular channel at the top of said conduit member; a packing ring of cushioning and sound-deadening material lodged in said channel and free for rotation about its vertical axis, the down-turned elbow arm dimensioned to fit within said ring and having gudgeons which pivotally engage said ring for rotating the ring in the channel with said tone arm in the movement of the latter for swinging over the record.

2. In a phonograph, in combination with a tone arm pivoted for swinging over the record, having at its pivoted end a downwardly-turned elbow arm, a vertically-positioned sound conduit member into which the elbow arm extends; a collar at the top of said conduit member having an in-turned

flange forming an interior annular channel at the top of said conduit member and having oppositely-positioned notches leading into said channel; a packing ring of cushioning and sound-deadening material lodged in said channel and free for rotation about the vertical axis thereof, the down-turned elbow arm having gudgeons which enter through said notches and pivotally engage said packing ring for carrying the latter with said tone arm in the swinging movement of said tone arm over the record about the vertical axis of said channel.

3. In a phonograph, in combination with a tone arm pivoted for swinging over the record, having at its pivoted end a downwardly-turned elbow arm; a vertically-positioned sound conduit member into which said elbow arm extends; a collar at the top of said conduit having an in-turned flange forming an internal annular channel at the top of said conduit member, and having oppositely-positioned notches leading into said channel; a packing ring of cushioning and sound-deadening material lodged in said channel free for rotation therein about its vertical axis, the down-turned elbow arm having oppositely-positioned gudgeons

which enter through said notches and the packing ring having in its upper surface undercut notches adapted to receive said gudgeons, whereby the tone arm is pivoted to the packing ring for vertical movement, and the packing ring constitutes a turntable for the tone arm in the swinging movement of the latter over the record.

4. In a phonograph, in combination with a tone arm pivoted for swinging over the record, having at its pivoted end a downwardly-turned elbow arm which is laterally cut away at its lower portion for discharge of the sound into the remainder of the sound conduit; a vertically-positioned sound conduit member into which said elbow arm extends, and in which it opens laterally, and a stop pin jutting inwardly from the wall of said sound conduit member in position to be encountered by the edge of the laterally-cut away elbow terminal of the tone arm limiting the swing of the tone arm over the record.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 22nd day of November, 1916.

LESLIE McARTHUR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

The first of these is the fact that the Chinese people are not a homogeneous race. They are a collection of many different tribes and peoples, each with its own language, customs, and traditions. This diversity has led to a rich and varied culture, but it has also made it difficult to create a unified national identity.

The second factor is the long history of foreign invasions and colonization. For centuries, the Chinese have been subjected to the rule of foreign powers, which has led to a loss of national pride and a sense of inferiority. This has made it difficult for the Chinese to develop a strong sense of national identity.

The third factor is the lack of a strong central government. For much of its history, China has been a collection of warring states, each with its own ruler. This has led to a lack of unity and a sense of fragmentation.

Despite these challenges, the Chinese people have managed to create a rich and varied culture. They have developed a unique system of government, a highly developed economy, and a strong sense of national identity. They have also made significant contributions to the world in many fields, including science, art, and literature.

The Chinese people are a resilient and determined people. They have overcome many challenges in the past, and they are confident that they can overcome the challenges of the future. They are a people who are proud of their heritage and who are committed to their future.

The Chinese people are a people who are proud of their heritage and who are committed to their future. They are a people who are resilient and determined, and they are confident that they can overcome the challenges of the future.

SOUND REPRODUCING MACHINES.

1,250,637 ----- P. J. Packman.
Patented Dec. 18, 1917.
Filed Oct. 14, 1910.

P. J. PACKMAN.
SOUND REPRODUCING MACHINE.
APPLICATION FILED OCT. 14, 1910.

1,250,637.

Patented Dec. 18, 1917.

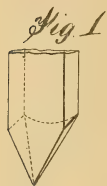


Fig. 4



Fig. 5



Fig. 6

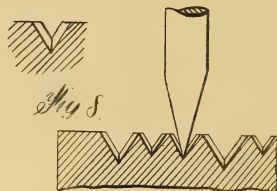
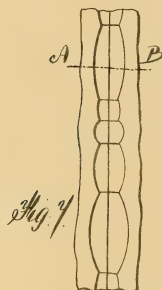


Fig. 9.

Witnesses:-

J. E. Kehlen,

L. C. Heinicke

Inventor
Peruval James Packman

by B. Singer
att.

UNITED STATES PATENT OFFICE.

PERCIVAL JAMES PACKMAN, OF HIGHBURY, LONDON, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AEOLIAN COMPANY, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SOUND-REPRODUCING MACHINE.

1,250,637.

Specification of Letters Patent.

Patented Dec. 18, 1917.

Application filed October 14, 1910. Serial No. 586,985.

To all whom it may concern:

Be it known that I, PERCIVAL JAMES PACKMAN, a subject of the King of Great Britain and Ireland, residing at 66 Hamilton road, Highbury, in the county of London, England, have invented certain new and useful Improvements Relating to Sound-Reproducing Machines, of which the following is a specification.

This invention relates to sound reproducing machines in which "hill and dale" cut records are employed and has for its object to increase the capacity of a record without substantially diminishing the volume of sound.

It has been usual to cut a record of the "hill and dale" type with the groove in the form of a U in cross section which has necessitated the use of a reproducing stylus terminating in a small ball.

Owing to the U form of the groove, it is not possible to obtain a very long record on the usual size of blank, as the convolutions of the spiral cannot be brought very close together and be cut to the required depth to give a good volume of sound owing to the risk of the convolutions overlapping one another to some extent.

According to the invention I cut a "hill and dale" groove of substantially a V shape in section and I employ a very fine or needle pointed stylus for the reproduction by contact of its extremity with the bottom of the V shaped groove. It will be understood that contrary to what is the case with a record formed by a U-shaped cutting instrument, there is a definite and distinct line of track, that is, the bottom of the groove cut by the point of the instrument, which always coincides with the true convolutions of the spiral or helix, and against which the point of the stylus fundamentally bears, as clearly seen from the drawing.

It will thus be understood that by securing frictional or bearing contact of the stylus with the bottom of the groove only, *i. e.*, the line of track a substantial clearance space will be left on either side, that is to say the angle between the sides of the groove will be greater than the angle of taper of the fine or needle pointed end of the reproducing stylus itself.

In the drawings, Figure 1 shows diagrammatically on a much enlarged scale by way

of example a cutter of sapphire or other suitable substance for cutting the V on the record. The angle between the cutting edges is acute, and the cutting faces or edges are ground so as to leave a sharp point which will actually yield a very narrow space at the bottom of the groove against which the extremity of the fine or needle pointed reproducing stylus may contact.

The stylus used in carrying out this invention has a hard, fine or needle point, and is preferably made of the highest grade hardened tool steel.

Figs. 2 to 6 show modified forms of tools adapted to be employed for cutting the V-shaped groove in a record. The tools are drawn to a large scale for the sake of clearness.

Fig. 7 shows a greatly enlarged plan view of a small portion of a track made according to this invention, showing the distinct line of track produced by the cutting of the groove and

Fig. 8 shows a cross section of the same on the line A—B of Fig. 7.

Fig. 9 shows diagrammatically to an enlarged scale a reproducing stylus in position with its fine or needle point in the bottom of the V shaped groove of a record.

The stem of the stylus is provided of ample thickness with its extremity only reduced to a fine point so that it may fundamentally bear on the line of track at the bottom of the groove formed by the use of a cutting tool such as illustrated in Figs. 1 to 6.

By such means it is possible to secure reproduction of a hill and dale V cut record without involving any substantial diminution in the volume of the sound, while, furthermore, it is possible to cut a relatively great number of threads per inch and thus to increase the capacity of the record while maintaining fullness and purity of tone without echo. It will thus be understood that the grooves cut will have a minute width and therefore also a minute depth, and that by reason of the recording tool acting as a cutter the walls of the groove will be sharply and cleanly cut and by reason of the cutter having a sharp point a smooth and continuous line will be cut at the bottom of the groove.

The stylus is conveniently mounted in a holder so that its movement due to the ver-

tical undulations of the line of track are directly communicated to the diaphragm in the usual manner.

What I claim as my invention and desire
5 to secure by Letters Patent is:—

In a sound-reproducing machine, the combination of a "hill and dale" record having a groove of V-shaped section with a definite line of track at the bottom; and a stylus hav-

ing a needle point of narrower V-shaped section bearing fundamentally on said line of track.

In testimony whereof, I affix my signature, in presence of two witnesses.

PERCIVAL JAMES PACKMAN.

Witnesses:

A. BROWNE,

L. SIMMONDS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RESETTING DEVICE FOR SOUND REPRODUCING MACHINES.

1,250,751 ----- T. Ahearn.
Patented Dec. 18, 1917.
Filed Jan. 16, 1917.

T. AHEARN.
 RESETTING DEVICE FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED JAN. 16, 1917.

1,250,751.

Patented Dec. 18, 1917.
 3 SHEETS—SHEET 1.

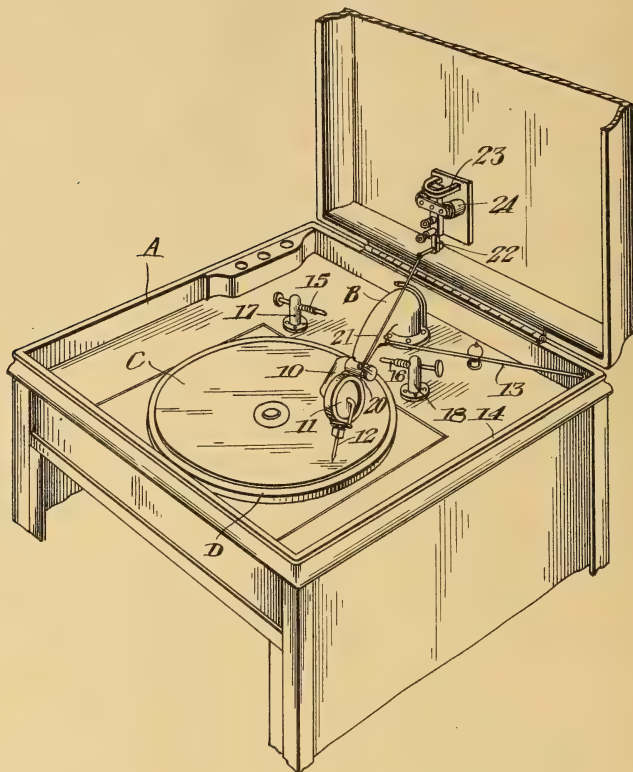


Fig. 1.

WITNESS

Wm. H. May

INVENTOR
 T. AHEARN.

BY

Jetherton Knapp & Co.

ATTY.

T. AHEARN.
 RESETTING DEVICE FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED JAN. 16, 1917.

1,250,751.

Patented Dec. 18, 1917.
 3 SHEETS—SHEET 2.

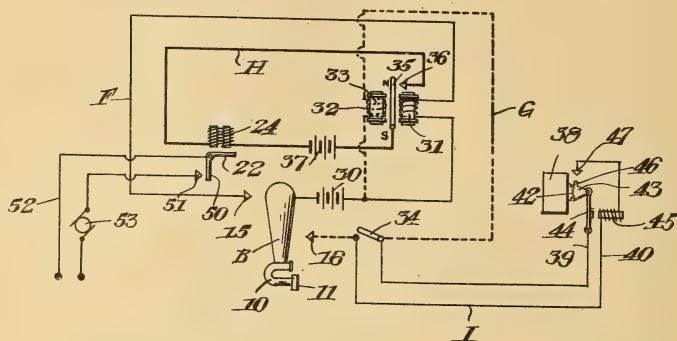


Fig. 2.

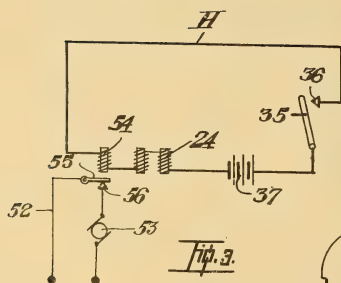


Fig. 3.

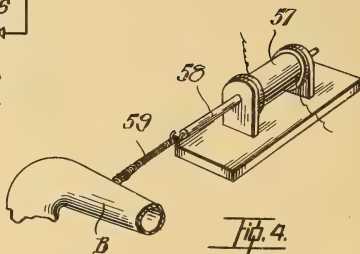


Fig. 4.

WITNESS
W. H. Hoyma

INVENTOR
 T. AHEARN.
 BY *Lutherstonhaugh & Co.*
 ATTYS.

T. AHEARN.
 RESETTING DEVICE FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED JAN. 16, 1917.

1,250,751.

Patented Dec. 18, 1917.

3 SHEETS—SHEET 3.

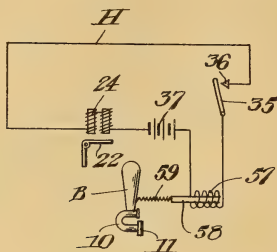


Fig. 5.

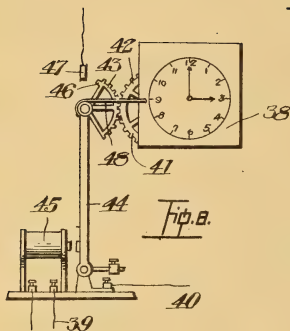


Fig. 6.

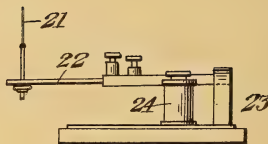


Fig. 7.

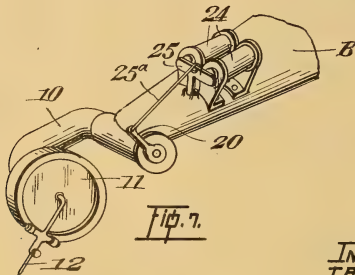


Fig. 8.

WITNESS

Wm. A. Hearn

INVENTOR
 T. AHEARN.

BY *Jefferstonhaugh & Co.*

ATTY.

UNITED STATES PATENT OFFICE.

THOMAS AHEARN, OF OTTAWA, ONTARIO, CANADA.

RESETTING DEVICE FOR SOUND-REPRODUCING MACHINES.

1,250,751.

Specification of Letters Patent. Patented Dec. 18, 1917.

Application filed January 16, 1917. Serial No. 142,694.

To all whom it may concern:

Be it known that I, THOMAS AHEARN, a subject of the King of Great Britain, and resident of the city of Ottawa, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Resetting Devices for Sound-Reproducing Machines, and do hereby declare that the following is a full, clear, and exact description of my invention, and such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in resetting devices for sound reproducing machines, and the objects of the invention are to provide a simple and effective device adapted to lift the stylus when it reaches near the end of a record and reset it at the beginning thereof. A further object of the invention is to enable the resetting to be effected immediately and continuously, or at given intervals.

Further objects are to generally simplify and improve the mechanism to enable the various parts thereof to better perform the functions required of them.

The invention consists essentially of the improved construction hereinafter described in detail in the accompanying specification and drawings.

In the drawings,

Figure 1 is a perspective view of a portion of a talking machine embodying the present invention.

Fig. 2 is a diagrammatic view of the electric circuit.

Fig. 3 is a diagrammatic view of an alternative form of one of the circuits.

Fig. 4 is a perspective detail of an alternative form of a device for returning the sound tube to normal position.

Fig. 5 is a diagrammatic view of an alternative form of one of the electric circuits.

Fig. 6 is a side view of the lifting magnet.

Fig. 7 is a perspective view showing an alternative form of the lifting device for the sound box.

Fig. 8 is a detail in the elevation of the timing device.

In the drawings like characters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents a sound reproducing machine or talking machine of any well known type, the construc-

tion of which does not form part of the present invention. The talking machine is provided with the usual swinging sound or tone arm B adapted to swing from side to side above the record C, which is carried on the rotating table D. The end of the swinging arm B carries the sound tube 10 and sound box 11, which carries the stylus or needle 12, the sound box tube being pivotally connected to the sound arm or tone tube B, whereby it may be lifted therefrom in a well known manner, when it is desired to reset or change the stylus.

Means are provided adapted to return the sound arm automatically to its starting position whenever the stylus is raised from the record. The means I have shown in Fig. 1 comprises an elastic cord or spiral spring 13 extending from the side of the sound arm to the side of the cabinet 14, the strength of the spiral spring or elastic cord being sufficient to move the sound arm when the stylus is raised, but insufficient to move it when the stylus is in contact with the record.

15 and 16 represent adjustable contacts provided on opposite sides of the sound arm and supported from suitable standards 17 and 18; these contacts are adapted to engage the sound arm when in position at the beginning and at the end of a record respectively and are included in the electric circuits hereinafter described.

The adjustability of the contacts to accommodate different size records is provided for by constructing them in the form of screw threaded pins extending transversely through suitable threaded perforations in the standards 17 and 18.

Electric operating means are provided for raising the stylus, the means I have illustrated in Fig. 1 comprise a lever 20 connected to the rotatable portion of the sound box tube, a link or wire 21 extending from the lever to an armature 22 which is pivotally mounted in the bracket 23 and controlled by a pair of electric magnets 24.

The contact 15 is included in what may be termed a resetting circuit F, shown in Fig. 2, and including suitable electrical conductors, a battery 30, one of the electromagnets 31 of a polarized relay 32. By tracing this circuit it will be observed that the circuit just completed is immediately broken by the sound arm moving away from contact 15, the momentary completion of this circuit causes the armature of the polarized

relay to be attracted by magnet 31 which still remains attracted to 31 by the force of the permanent magnet of the polarized relay, thus the lifting circuit remains closed against 36, thereby maintaining the lifting circuit closed until the armature is attracted in the opposite direction by electromagnet 33 of the polarized relay.

The other electromagnet 33 of the polarized relay is included in what may be termed the "returning" circuit G, shown in dotted lines in Fig. 2, and including the battery 30, a single throw switch 34 and the adjustable contact 16.

The electromagnets of the polarized relay control the movements of the armature 35, which being polarized will remain either toward 31 or 33 dependent upon which electromagnet of the polarized relay last attracted it and vice versa. When the electromagnet 31 is energized the armature will be brought toward 31 and notwithstanding that the circuit has been broken the permanent magnetism will retain the armature sufficiently intimately to maintain the lifting circuit H complete and unbroken.

It will be seen that when the magnet 33 is energized, the armature 35 will be drawn away from the contact 36.

The electromagnets 24 are adapted when energized to lift the armature 22 which, when raised, will lift the stylus 12 through the link 21 and lever 20.

The operation of the circuits and elements so far described are as follows:

When the sound arm reaches near the end of the record it will engage the contact 15, this will complete the circuit F through the contact conductor, magnet 31 of the polarized relay 33, battery 30 and sound arm B.

The magnet 31, when energized, will move the armature 35 into engagement with the contact 36 completing the lifting circuit H, thereby energizing the magnets 24, moving the armature 22 which will lift the stylus as explained before.

When lifted the elastic or spiral spring 13 will return the sound arm to its starting or normal position, the circuit F being broken in the meantime by movement of the sound arm.

In returning to normal position the sound arm will engage the contact 16 and this, if the switch 34 is closed, will complete the returning circuit G through the sound arm contact 16, magnet 33, and battery 30, which will draw the armature 35 away from the contact 36 breaking the lifting circuit and permitting the stylus to drop by gravity to normal position on the record and continue the playing of the piece.

It will be seen that by reason of the fact that the armature of polarized relay 32 is polarized (*i. e.* under the influence of a permanent magnet), the armature 35 will

remain at either one side or the other, against 31 or 33, according to which set of magnets has been last energized.

The polarized relay may be of any suitable form, well known in the art, (such as for instance that manufactured by the J. H. Bonnell & Co., Park Place, New York city, U. S. A.).

The table D carrying the record will turn continuously when actuated by the usual motor of the talking machine.

When it is desired to allow intervals to elapse between the repetition of the operation, a time circuit I is provided having leads connected to opposite sides of the switch 34, these leads extend to a suitable timing device 38. This timing device, which may be of any suitable character well known in the art, is adapted at intervals to connect the conductors 39 and 40 and thereby connect opposite sides of the switch 34 or in effect close the switch temporarily.

The form of timing device I have shown is that previously invented by me and shown in my United States Patent No. 329,874 of 1885, and includes a clock work mechanism 41 which operates a gear 42 meshed with a segmental gear 43 pivotally mounted on an armature 44, which itself is pivotally mounted in advance of an electromagnet 45. The segmental gear carries a contact 46 adapted when raised by the clock work mechanism to engage a fixed contact 47. When this is done the circuit is completed through the magnet 45 which draws the armature and segmental gear away from the gear 42 which permits the segmental gear to move downward or upward under the influence of gravity, downward and upward under the influence of the spring or elastic 48 extending between the segment and the fixed support.

This elastic or spring also serves to return the armature 44 to its normal position.

The details of this clock work mechanism are, however, more fully described in my aforesaid Patent No. 329,874 of 1885.

In using the timing device, it is necessary, first to move the switch 34 to open position. It will then be seen that, when the sound arm is returned to the position against the contact 16, as previously explained, the circuit G will not be completed until the timing device operates to move the segment 43 into engagement with the contact 47. This may be caused to take place at any desired interval and when it does take place the sound stylus will drop and the operation of the sound reproducer will continue.

When the talking machine is operated by an electric motor, it may be found desirable to save power by cutting out the motor during the interval when the machine is not operated. Electromagnetic means may be provided for doing this. In Fig. 2 I have

shown an extension 50 on the armature 22 adapted normally to engage a contact 51, a circuit 52 including the motor 53 being completed through the extension 50 of the contact 51. When the armature 22 is raised, it is adapted to move the armature 50 away from the contact 51 and thus break the motor circuit, which will however, be completed again when the armature 22 is allowed to drop by breaking of the circuit H as previously explained.

In Fig. 3 I have shown an alternative method of breaking the motor circuit. In this figure the circuit H is shown to include an electromagnet 54 controlling an armature 55 which cooperates with a contact point 56. When the magnet 54 is energized, it is adapted to lift the armature from the contact point 56 and thus break the motor circuit 52.

In Fig. 4 I have shown an alternative means for returning the sound arm to normal position. These means include a solenoid 57 having a movable core 58 connected by a spring 59 or other means to the sound arm. The solenoid 57 will be included in the lifting circuit H, whereby when the sound arm moves into contact with the contact 15, the solenoid will be energized to draw the sound arm back to normal position.

In Fig. 5 I have shown diagrammatically the electric connections for the modification shown in Fig. 4.

Fig. 7 shows an alternative form of the invention in which the lifting magnets 24 are placed directly on the sound arm and are adapted, when energized to draw a movable armature 25 inwardly, the armature being connected to the lever 20 by a link 25^a, the operation of the mechanism being in other respects the same as already described.

It is thus seen that the arrangement of electric circuits and elements described enable a given record to be played either continuously or repeated automatically at given intervals of time.

As many changes could be made in the above description and many apparently widely different embodiments of my invention within the scope of the claims constructed without departing from the spirit or scope thereof, it is intended that all matter contained in the accompanying specification and drawings shall be interpreted as illustrative and not in a limited sense.

What I claim as my invention is:

1. In a sound reproducer and in combination an oscillatable movable element forming part of the sound reproducing mechanism, electrically operated resetting means therefor including a resetting circuit, a lifting circuit, a circuit changing device having a movable member adapted, in one position to complete the lifting circuit and in another position, to break the same, and a return cir-

cuit adapted to be completed by the oscillatable movable element when it returns to the starting position and including a part of the circuit changing device, whereby, when the return circuit is completed, the circuit changing device will be moved to break the lifting circuit.

2. In a sound reproducer and in combination an oscillatable movable element forming part of the sound reproducing mechanism, electrically operated resetting means adapted to reset the sound reproducing means of the instrument at the starting position, including a resetting circuit, a lifting circuit, a circuit changing relay having two coils and a movable member, one of said coils being included in the resetting circuit, the moving member adapted in one position to complete the lifting circuit and in another position to break the same, and a return circuit adapted to be completed by the oscillatable movable element when it returns to the starting position and being connected to the other coil of the circuit changing relay, whereby, when the return circuit is completed, the circuit changing relay will be moved to break the lifting circuit.

3. In a sound reproducer and in combination an oscillatable movable element forming part of the sound reproducing mechanism, a pair of contacts located on opposite sides thereof, adapted to engage the oscillatable element when the sound reproducing mechanism is at the beginning and end of a record, electric circuits including means for resetting the sound reproducing mechanism and maintaining the same in inoperative position, means associated with one contact for rendering said circuits operative, and means associated with the other contact for rendering said circuits inoperative.

4. In a sound reproducer, and in combination, sound reproducing means, an oscillatable element in said means, a lifting electric circuit adapted to return the sound reproducing means to starting position, but adapted to hold the same in inoperative position, and adapted, when the circuit is broken, to permit the said reproducing means to move to operative position and continue the reproduction of the sound from the record, two electric circuits, one of which is adapted to be completed by the movable element at the beginning and one at the end of its movement, one of said electric circuits including means for completing the lifting circuit, and the other electric circuit including means for breaking the lifting circuit.

5. In a sound reproducer having a swinging arm and a stylus carried thereby, a polarized relay and an armature associated therewith, a resetting circuit controlling one electromagnet of the polarized relay, a contact in the resetting circuit adapted to be engaged by the sound arm when it reaches

a position near the end of the record, the circuit being adapted to be completed through the contact and sound arm, a return circuit controlling the second magnet of the relay, a second contact in the return circuit adapted to engage the sound arm when it reaches its initial position, a lifting circuit including the aforesaid armature and a contact point and means for lifting the stylus, and means for returning the sound arm to normal position.

6. In a sound reproducer and in combination a swinging sound arm and stylus thereon, contacts on opposite sides of the said sound arm, and means associated with one contact adapted when the arm is engaged therewith to return the arm to normal position but maintain the stylus in raised position, means associated with the other contact point adapted to cause the stylus to drop to its normal position on the record.

7. In a sound reproducer having a swinging arm and a stylus carried thereby, a po-

larized relay having two electromagnets, an armature associated therewith, a resetting circuit controlling one electro-magnet of the polarized relay, a contact in the resetting circuit adapted to be engaged by the sound arm when it reaches a position near the end of the record, the circuit being adapted to be completed through the contact and sound arm, a return circuit controlling the other electro-magnet of the polarized relay, a second contact in the return circuit adapted to engage the sound arm when it reaches its initial position, a lifting circuit including the aforesaid armature and a contact point and means for lifting the stylus, and means for returning the sound arm to normal position.

In witness whereof I have hereunto set my hand in the presence of a witness.

THOMAS AHEARN.

Witness:

RUSSEL B. SMART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."

RECORD REMOVING DEVICE FOR TALKING MACHINES.

1,250,795 ----- S. Canda,
Filed Feb. 24, 1917.
Patented Dec. 18, 1917.

S. CANDA.
 RECORD REMOVING DEVICE FOR TALKING MACHINES.
 APPLICATION FILED FEB. 24, 1917.

1,250,795.

Patented Dec. 18, 1917.

Fig. 1.

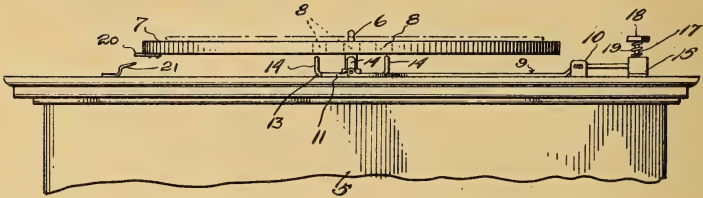


Fig. 2.

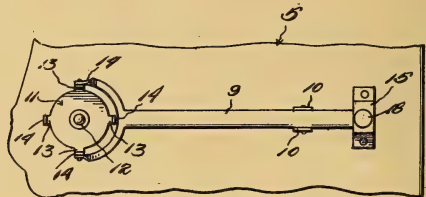
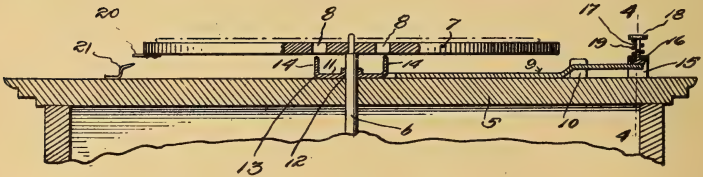


Fig. 4.

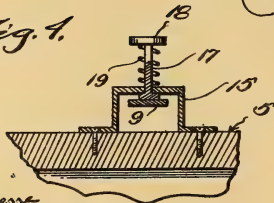


Fig. 5.

Inventor

S. Canda

Witness
 J. MacCarter
 Ed. Queller

By *Charles Canda*
 Attorney

UNITED STATES PATENT OFFICE.

STEFAN CANDA, OF PHILADELPHIA, PENNSYLVANIA.

RECORD-REMOVING DEVICE FOR TALKING-MACHINES.

1,250,795.

Specification of Letters Patent.

Patented Dec. 18, 1917.

Application filed February 24, 1917. Serial No. 150,733.

To all whom it may concern:

Be it known that I, STEFAN CANDA, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Record-Removing Devices for Talking-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement in talking machines and has particular reference to a record removing device.

An object of the invention is to facilitate the removal of a record, after the completion of the reproduction thereof, from the turntable of a disk machine by raising the record from engagement therewith and, to this end, use is made of a member pivoted to the machine and having one end extending beneath the turntable and means adapted to engage the bottom of the record when the other end of said member is depressed in order that the record may be raised from engagement with said turntable and then removed.

The inventive idea involved is capable of receiving a variety of mechanical expressions, one of which, for the purpose of illustrating the present invention, is shown in the accompanying drawing, wherein:—

Figure 1 is a fragmentary side elevation of a talking machine showing the invention applied thereto.

Fig. 2 is a vertical sectional view.

Fig. 3 is a top plan view of the record raising mechanism.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Referring more particularly to the accompanying drawing the numeral 5 indicates a talking machine of any preferred construction having the usual turntable shaft 6 and turntable 7 mounted thereon and provided adjacent the center thereof with a plurality of openings or slots 8 for a purpose which will appear in the course of the description.

The invention is illustrated in what is now believed to be its preferred form and consists of a lever 9 pivoted intermediate its ends in the bracket 10 carried by the top of the machine, said lever extending radially with respect to the shaft 6 and having one end projected beneath the turntable 7. This

end of the lever 9 is pivoted to a plate or disk 11 having a central opening 12 for receiving the shaft 6 and the plate is further provided with a plurality of laterally disposed record engaging fingers 13 having their free ends turned upwardly as indicated at 14. When removing a record the operation of the lever 9 will cause the plate 11 to be raised and project the free ends of the fingers 13 into the openings 8 in the turntable 7 until said ends engage the record mounted on said turntable. The continued upward movement of the plate 11 will then raise the record from contact with the turntable after which the same may be easily grasped by the operator and removed from the machine.

The means for operating the lever 9 preferably comprises a bracket 15 secured to the top of the machine adjacent the turntable and having a portion thereof overhanging the outer end of said lever 9. The said portion of the bracket 15 is provided with an opening 16 which receives one end of a plunger 17 having a head 18 and interposed between said bracket and said head is a coil spring 19 for normally retaining the plunger in a raised position. By depressing the head 18 of the plunger against the tension of said spring the lower end of the former will contact with the outer end of the lever 9 and depress the same thus raising the plate 11 and fingers 13 supported by the inner end of said lever.

Before removing a record from the turntable 7 it is necessary to rotate the latter to a position where the openings 8 will be in vertical alinement with the upturned ends 14 of the fingers 13 and for this purpose the turntable is preferably provided with a pointer 20 which coöperates with a stationary pointer 21 on the top of the machine so that by rotating the turntable until the pointer 20 is disposed adjacent the pointer 21 the operator will know that said openings are in registration or vertical alinement with the ends of said fingers.

What is claimed is:—

1. The combination with a talking machine having a turntable provided with openings therein; of adjustable means disposed beneath said turntable and operable to be projected through the openings therein to disengage a record therefrom.

2. The combination with a talking machine having a turntable provided with open-

ings therein; of adjustable means disposed beneath said turntable and operable to be projected through the openings therein to disengage a record therefrom, and a lever 5 pivoted to said machine and connected to said means for adjusting the same.

3. The combination with a talking machine having a turntable provided with openings therein; of adjustable means disposed 10 beneath said turntable and operable to be projected through the openings therein to disengage a record therefrom, a lever pivoted to said machine and connected to said means for adjusting the same, and a spring 15 pressed plunger for actuating said lever.

4. The combination with a talking ma-

chine including a turntable having openings therein, of a plate disposed beneath said turntable and having a plurality of fingers extending therefrom and adapted to be projected into said openings, a lever pivoted to the machine and connected to said plate, and depressible means for actuating said lever to project said fingers into said openings and into contact with a record on said turntable 25 to disengage said record therefrom.

In testimony whereof, I affix my signature in the presence of two witnesses.

STEFAN CANDΛ.

Witnesses:

RONSOR GOVESDION,
ANOBNE SWOBIA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC STARTER FOR TALKING MACHINES.

1,351,100 ----- F. Puschnerus.

Patented Dec. 25, 1917.

Filed Feb. 28, 1917.

F. PUSCHNERUS.
AUTOMATIC STARTER FOR TALKING MACHINES.

APPLICATION FILED FEB. 26, 1917.

1,251,100.

Patented Dec. 25, 1917.

2 SHEETS—SHEET 1.

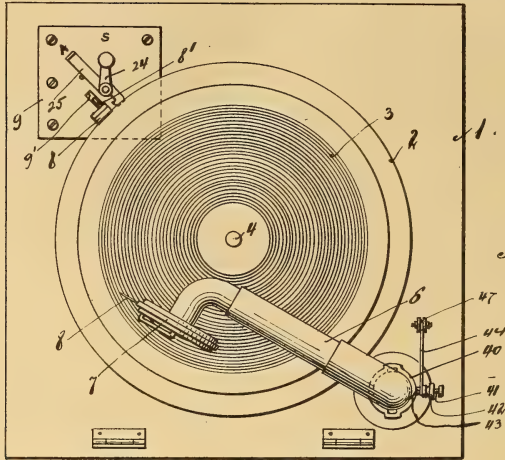


Fig. 1

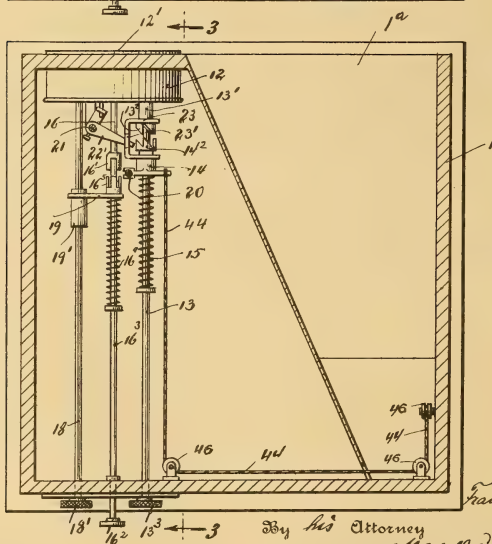


Fig. 2

Inventor
Frank Puschnerus

By his Attorney

Max F. Ordman

F. PUSCHNERUS.
 AUTOMATIC STARTER FOR TALKING MACHINES.
 APPLICATION FILED FEB. 26, 1917.

1,251,100.

Patented Dec. 25, 1917.

2 SHEETS—SHEET 2.

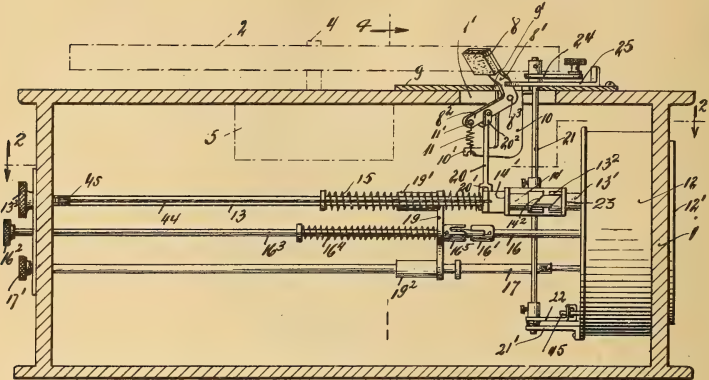


Fig. 3

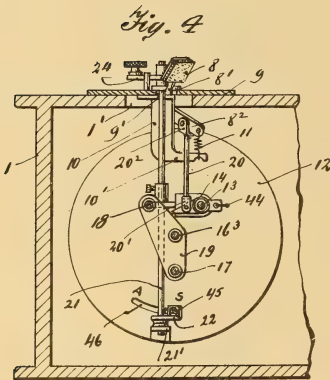


Fig. 4

Inventor
 Frank Puschnerus
 By his Attorney
 Max V. Orduan

UNITED STATES PATENT OFFICE.

FRANK PUSCHNERUS, OF NEW YORK, N. Y.

AUTOMATIC STARTER FOR TALKING-MACHINES.

1,251,100.

Specification of Letters Patent. Patented Dec. 25, 1917.

Application filed February 26, 1917. Serial No. 150,941.

To all whom it may concern:

Be it known that I, FRANK PUSCHNERUS, a subject of the German Emperor, residing at New York, in the county of New York and the State of New York, have invented certain new and useful Improvements in Automatic Starters for Talking-Machines, of which the following is a specification.

The present invention relates to improvements in talking machines, particularly to means for automatically starting the driven record supporting disk.

One object of my invention is to provide a self-starter for the record support whereby at a predetermined time the driven support will be released and the machine started.

My invention also has other objects in view which will be obvious from the detailed description thereof.

The same is illustrated in the accompanying drawings which form part of this specification and in which similar reference characters denote corresponding parts, Figure 1 being a plan view of the talking machine with the cover removed and showing parts of the starting and stopping mechanism; Fig. 2 is a sectional plan view on line 2—2 of Fig. 3 of the machine showing the parts of the starting and stopping mechanisms located inside the cabinet or box; Fig. 3 is a cross section on line 3—3 of Fig. 2; and Fig. 4 is a vertical section on line 4—4 of Fig. 3.

Referring to the drawing and particularly to Figs. 1—8, 1 denotes the cabinet or box of the talking machine which may be of any suitable construction. 2 is the movable or rotary base or support for the records 3 which base, as usually, is mounted on the spindle 4 and driven from a mechanism 5 located within the cabinet or box. Since the driving of the machine does not constitute part of my invention, a detailed description of the driving means is dispensed with.

6 denotes the horn or hollow arm which carries the sound box 7 and stylus 8 and which is mounted in the cabinet in a well known manner, the same communicating with the hollow 1^a of the cabinet from which the sound issues. As usually, the driven base 2 of the records 3 is arrested and held against rotation by a brake member 9 which is adapted to be pressed against

the outer circumference of the disk or support 2.

My invention resides in the means for operating the brake so as to release the same at a predetermined time.

To accomplish this I provide a clock 12 which is suitably mounted within the cabinet so that its face (dial with pointers) is exposed to the outside. The clock used for accomplishing my object may be of a similar construction as an ordinary alarm clock, *i. e.* equipped with a spring operated or otherwise driven mechanism which is controlled by the clock mechanism so that at a previously set time the said mechanism will be released from the clock and be set into operation. As an alarm is not required, the alarm proper (hammer and bell) may be omitted. For the purpose of this invention the clock controlled mechanism may consist simply of a suitably driven spindle 13' which for simplicity's sake I shall refer to hereafter as the starting mechanism or spindle and which has the usual means whereby its operation is controlled from the clock. In the present example the clock is shown mounted in one of the walls of the cabinet. The spindles 13, 16, 17 and 18 for winding up the starting spindle 13', for the adjustment of the pointers, for the starting mechanism and for winding up the clock respectively are all extended from the back of the clock through the cabinet to project outwardly from the opposite wall and to carry knobs 13³, 16², 17¹ and 18¹ respectively for the manipulation of the said spindles from outside the casing or cabinet. In order not to burden the spindle of the pointers, the same is composed of two sections, to wit 16 and 16³, which normally are held disengaged by a spring 16⁴, but which can be coupled by means of a coupling 16⁵ of any suitable construction when it is desired to set the pointers. The section 16³ of the spindle of the pointers may be movably supported in the cabinet by means of a plate 19 which is formed with sleeve-like projections 19¹, 19² engaging around the spindles 18 and 17 respectively.

The brake block 8 is fixed to an angular lever 8', 8² which is fulcrumed at 8³ in a slot 1' made in the top of the cabinet. 9^a is a metal plate fixed to the top of the cabinet over said slot and having a corresponding slot 9' through which the upper arm 8' 110

of the lever projects outwardly. The lower arm 8² projects downwardly into the cabinet and has attached to it one end of a spring 11, the other end of which is fixed to the horizontal arm 10' of a bracket 10 fixed to and projecting from the bottom of the metal plate 9. The spring 11 has the tendency to draw the brake arm into operative position to press against the rotary base 2.

Loosely mounted on the spindle 13 is a sleeve 14 which near one end is formed with an annular shoulder 14' and at the other end is provided with teeth or cam-shaped projections 14². The enlarged portion 13' of the starting spindle 13 is provided with similar projections 13² as those of the sleeve 14, which coöperate with the sleeve 14 to bring about a coupling of the latter with the starting spindle 13. The sleeve 14 is actuated by a spring 15 one end of which is fixed to the spindle 13 and the other end of which abuts against the rear end of the coupling sleeve 14. This spring tends to constantly press the sleeve 14 into engagement with the part 13' of the spindle 13. A rod or link 20, the ends 20' and 20² of which are bifurcated, is pivotally connected at one end to the sleeve 14 and at the other end to the lower arm 8² of the brake lever.

When the sleeve 14 is uncoupled from the starting spindle 13' it will be allowed to swing on the spindle 13 and owing to the force of the spring 11 the rod or link will be lowered. The brake will then be in operative position. The teeth of the coupling parts 14², 13² are so shaped that when the spindle 13 is at rest or is rotated in the direction to wind up the starting mechanism, they will slide over one another and the downward pull of the spring will hold the brake in operative position. But when the spindle 13 on its release from the clock will be set into rotation in the opposite direction, the teeth 13² will be coupled with the teeth 14² and thereby cause the sleeve to turn in the same direction, thereby raising the rod or link 20 against the pull of the spring 11, in consequence of which the brake will be moved away from the rotary and driven base 2, permitting the latter to start its motion. Thus at a set time, the machine will be automatically started through the medium of the clock controlled spindle 13 which positively moves the brake 8 into operative position.

The starting mechanism 13, 13' may be temporarily cut out in the usual manner through the adjustable stop 45 projecting outwardly from the back of the clock and movable through a circularly shaped slot 46. Connected with this stop 45 is a lever 22 fixed to the lower end of a vertical rod or spindle 21 which is rotatively supported in a bracket 21' fixed to the back of the clock. The rod 21 is adapted to project out-

wardly through the plate 9 and to carry on its outer end a lever or handle 24 whereby the adjustment of the stop 45 into "alarm" or "stop" position can be effected. Slidably mounted on the sleeve 14 of the enlarged portion 13' of the spindle 13 is a shifter frame 23 which is longitudinally recessed, as at 23', through which projects an arm 22' fixed on the rod 21. This shifter frame 23 when moved by the arm 22' outwardly can be brought to rest against the shoulder of the coupling sleeve 14 to hold the latter out of engagement. The shifter plate or frame 23 and arm 22' serve as an auxiliary stop mechanism. Thus, when the automatic operation of the brake is not desired, the shifter frame 23 may be moved to engage the collar 14' of the coupling 14 and to thereby lock it out of engagement with the part 13².

We will assume that the shifter frame 23 is in normal position in which it leaves the sleeve 14 free to swing on the spindle 13 and to move longitudinally thereon under the influence of the spring 15; and we will assume that the brake lever is in operative position, that is, holding the record support at rest. While the sleeve 14 is uncoupled from the spindle 13, it is capable of swinging freely on the spindle 13 so that the link 20, under the influence of the spring 11, will be lowered, while the brake is on. As soon, however, as the spindle 13, is released and set into operation by the clock mechanism at a pre-determined time the sleeve 14 will engage with its teeth 14², the teeth 13² of the spindle and be carried along with it in the same direction. In consequence thereof, the link 20 will be raised and positively swing the lever 8', 8² against the tension of its spring 11, so as to remove the brake 8 from the record support, which then under its motive power will commence to revolve.

If it is not desired to have the brake operated automatically from the starting spindle 13, the shifter frame 23 through the medium of the rod 21, and the arm 22' is displaced so as to move the sleeve 14 out of contact with the teeth 13², and retain it in this position as long as the automatic control is not desired, so that the operation of the spindle 13 under the control of the clock mechanism will have no effect on the brake.

Since various modifications may be made in the construction without deviating from the principle of my invention, I do not wish to limit myself to the details shown and described.

What I claim and desire to secure by Letters Patent is:

1. In a talking machine, the combination with the driven record support, of a brake for the latter, a clock controlled spindle adapted to operate only at times, a spring actuated member rotatively and slidably

mounted on said spindle, coupling means permitting the self-coupling of said sleeve to said spindle, a link connecting said member to said brake and adapted when the spindle is set into motion, to positively move said brake into operative position.

2. In a talking machine, the combination with the driven record support, of a brake for the latter, a clock controlled spindle, adapted to operate only at times, a rotary and longitudinally movable spring actuated sleeve on said spindle, coupling means allowing the self-coupling of said sleeve to said spindle when the latter revolves in a certain direction, said sleeve being connected to said brake so as to positively move the latter into operative position when the spindle is set into operation.

3. In a talking machine, the combination with a driven record support, of a spring actuated brake for the latter, a starting mechanism comprising a clock controlled spindle, a sleeve rotatively and slidably mounted on said spindle and capable of self-coupling to said spindle when the latter revolves in a certain direction, and a rigid

member pivotally connecting said brake to said sleeve and which when the latter is coupled to and revolves with said spindle will move the brake against the tension of its spring force away from said record support.

4. In a talking machine, the combination with a driven record support, of a brake including a spring actuated lever carrying said brake, a starting mechanism comprising a clock controlled spindle, a sleeve rotatively and slidably mounted on said spindle and capable of self-coupling to said spindle when the latter revolves in a certain direction, and a link pivotally connected at one end to said brake lever and at the other end to said sleeve and adapted when the latter is coupled to and revolves with said spindle to move said brake lever away from said record support against the tension of its spring force.

In testimony whereof I affix my signature in the presence of a witness.

FRANK PUSCHNERUS.

Witness:

D. B. KLEIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



SYNCHRONIZING MECHANISM FOR MOTION PICTURE AND SOUND
REPRODUCING MEANS.

1,251,287 ----- H. W. Rogers,
Filed Feb. 7, 1918,
Patented Dec. 25, 1917.

H. W. ROGERS,

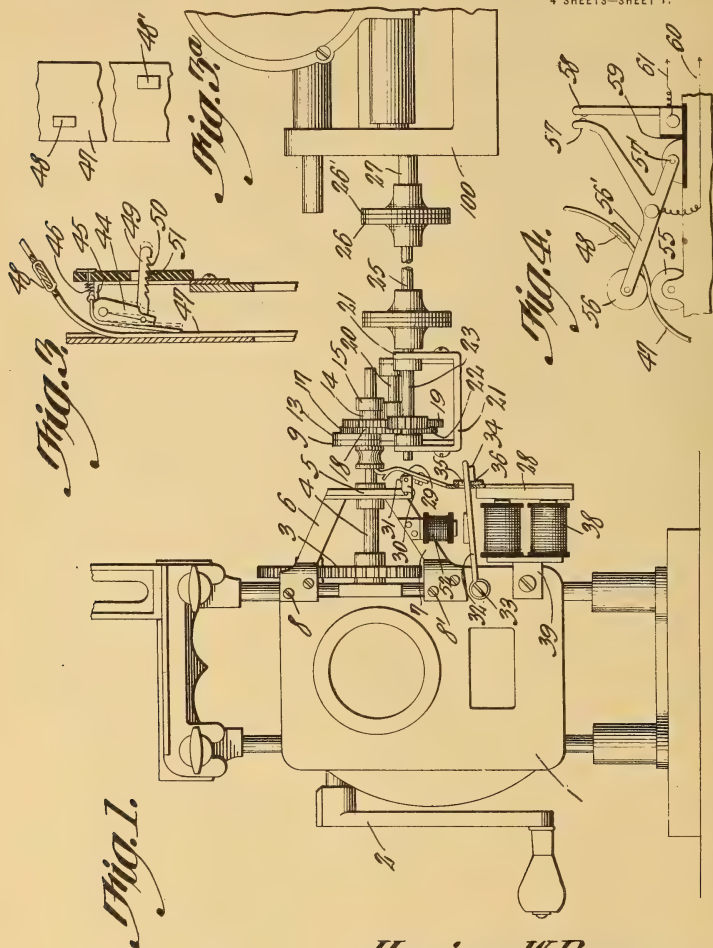
SYNCHRONIZING MECHANISM FOR MOTION PICTURE AND SOUND REPRODUCING MEANS.

APPLICATION FILED FEB. 7, 1913.

Patented Dec. 25, 1917.

4 SHEETS—SHEET 1.

1,251,287.



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SYNCHRONIZING MECHANISM FOR MOTION PICTURE AND SOUND REPRODUCING MEANS.

Patented Dec. 25, 1917.

4 SHEETS—SHEET 2.



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SYNCHRONIZING MECHANISM FOR MOTION PICTURE AND SOUND REPRODUCING MEANS.

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1,251,287.

4 SHEETS—SHEET 3.

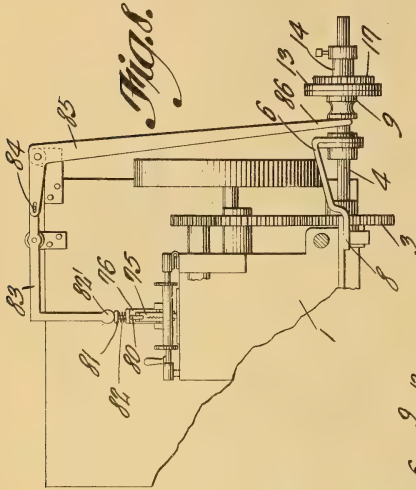


Fig. 8.

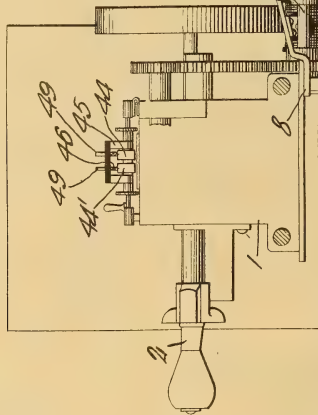
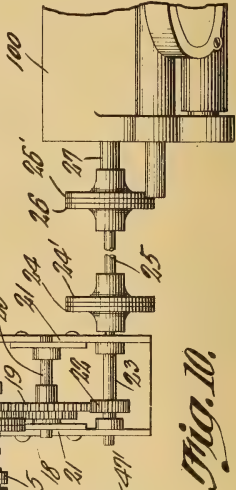


Fig. 9.



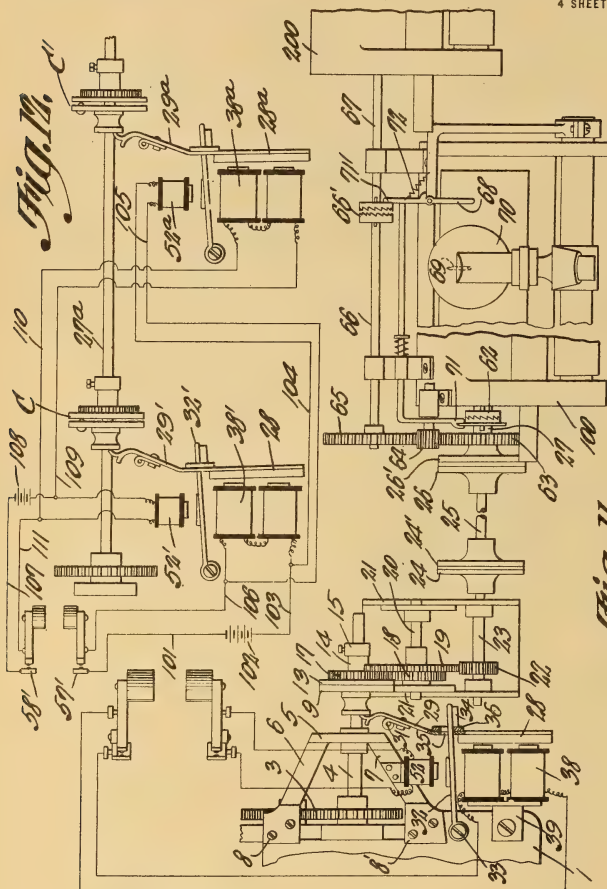
H. W. ROGERS.
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APPLICATION FILED FEB. 7, 1913.

1,251,287.

Patented Dec. 25, 1917.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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SYNCHRONIZING MECHANISM FOR MOTION-PICTURE AND SOUND-REPRODUCING MEANS.

1,251,287.

Specification of Letters Patent.

Patented Dec. 25, 1917.

Application filed February 7, 1913. Serial No. 746,890.

To all whom it may concern:

Be it known that I, HARRISON W. ROGERS, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Synchronizing Mechanism for Motion-Picture and Sound-Reproducing Means, of which the following is a specification.

The present invention relates to improvements in synchronizing mechanisms for motion picture and sound reproducing means.

Heretofore, in practising inventions of this character, where endeavors have been made to have an exact starting to produce synchronism or harmony between the movement of the actors produced by the projection of the image of the film, and the voice or sounds supposed to emanate simultaneously therewith, it has been impossible to secure at all times the necessary harmonious action of the sound reproducing machine with the motion picture machine, and it is therefore one object of the present invention to produce a means for automatically starting and stopping the synchronizing mechanism interposed between the projector of the motion picture machine and the sound record carriers, and through the action or instrumentality of the record of the former.

Another object of the present invention is the provision of means, whereby it is unnecessary that the sound reproducing record be produced simultaneously with the photographing of the image, it being possible with the present apparatus, to employ any good sound reproducing record and operate a photographing mechanism of a motion picture machine so that the motions of any actor may be taken in harmony or sympathy with the sound reproducing record, and independently thereof, so that as is the present practice the risk in having a good film and a fair or poor record, or vice versa, is avoided.

Another object of the present invention is the provision of a clutch mechanism interposed between the motor of a projector of a motion picture machine and the sound record carrier, which may be mechanically or electrically controlled through the medium of the moving film within the projector mechanism, thereby insuring the proper manipulation of the clutch so that the sound record carrier will be started and stopped

according to the movement of the film, which thus insures absolute harmony or synchronism in the operation of the film and the sound record.

Another object of the present invention is the provision of a synchronizing device which may be timed for operation, as to its starting and stopping in harmony with the film, at any point or points upon the film, such points being selected upon the film, so means can be placed upon the film to coact with means carried by the projector, to, at the proper time throw in or out the clutch and thus insure the proper actuation of the sound record carrier, the breakage of the film simply necessitating the filling in of an equal length of film removed so as to compensate for the loss thereof, and without interfering with the synchronous action between the projecting motor and the sound record carrier.

Up to the present time, it has been impracticable to exhibit by the moving film, while the sound record was being operated, titles and announcements, for the reason that no provision has been made for halting the sound record carrier during the presentation of the titles or announcements by the film, and further as a full film is usually of sufficient length to necessitate the employment or use of two or more sound records, and therefore permits the projection of means for illustrating in songs, several songs, it is desirable that each song be announced by title. The present device is capable of performing these functions, there being provided means controlled by the film for connecting the clutch members so that the sound record is rotated at the desired instant and after the presentation of a title upon the screen, through the film, such sound record being disconnected and halted while the next succeeding title for the following sound record is presented, the second record and so on, being operably connected and disconnected from the projector similar to the first one. It is therefore one intention of the present invention, to provide a means, whereby the film at the proper time operates a means to operate and permit the locking of the clutch members in engaged position, there being an automatic lock for locking the clutch members in such position, and at the proper time to release the locking de-

vice to free the clutch members so that the sound record is brought to a stoppage even though the film is continued in movement to present the title and the next succeeding scene. It is also apparent with the present device that the sound record may be started with the film and that a stopping device for the sound record be controlled entirely through the instrumentality of the film and not necessitate the stoppage of the projector and film mechanism to bring the sound record to a halt as is the usual practice, or to manipulate a manually controlled means for releasing the sound record from the projector.

It is also apparent that the closure of the electrical circuits for energizing the clutch throwing and lock releasing electromagnets is only for an instant, thus conserving the electrical energy and not necessitating the closure of the circuit during the entire operation of the sound record carrier.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made without departing from the scope of what is claimed without departing from the spirit of the invention.

In the drawings—

Figure 1 is a front elevation of the projector mechanism of a motion picture machine and a portion of a cylindrical sound record carrier connected for operation according to the present invention.

Fig. 2 is a side elevation of the projector mechanism taken from the right as viewed in Fig. 1 with the means for communicating motion therefrom to the sound record carrier.

Fig. 3 is an enlarged detail sectional view of the mechanism carried by the projector and the film for controlling the operation of the clutch.

Fig. 3* is a plan view of a film having the two switch closures.

Fig. 4 is an enlarged detail view of another form of film actuated electrical contact, wherein the film or operating part carried thereby does not constitute a portion of the circuit.

Fig. 5 is a diagrammatic view showing the position of a film within the projector mechanism with the contact shown in Fig. 3.

Fig. 6 is an enlarged detail sectional view of the clutch of the motion communicating or transmission means.

Fig. 7 is a top plan view of the projector and a portion of a sound record carrier with the transmission means therebetween, the projector in this case being provided with a mechanical clutch throwing device.

Fig. 8 is an enlarged detail view showing the mechanical clutch throwing device.

Fig. 9 is an enlarged detail sectional view of the film controlled mechanical mechanism for actuating the clutch lever.

Fig. 10 is an enlarged detail view of a portion of a film provided with the means for throwing the clutch actuating device as shown in Fig. 9.

Fig. 11 is a top plan view illustrating one method of connecting a series of sound record carriers for successive operation.

Fig. 12 illustrates another method.

Referring to the drawings, the numeral 1 designates the main frame and mechanism carrying portion of the projector, having in the present instance the manually operated handle 2, which in motor machines is displaced by the usual electric or other motor. The gearing 3 of the projector mechanism is of any construction, the present projector being indicative of any form of projector now on the market. The present invention and apparatus is designed to be applied to any projector now in use, and not necessitate the rearrangement or reconstruction, or the production of a new projector mechanism. The shaft 4 is extended to be operated by the gearing of the projector mechanism, and as shown, is journaled in the sleeve 5 carried in the outer end of the brackets composed of the diverging arms 6 and 7, which are connected at 8-8' to the forward portion of the projector frame. This structure is therefore applicable to any projector, the brackets 6 and 7 being the only part that is changed according to the projector gearing to which it is applied.

Disposed upon the outer end of the shaft 4, beyond the brackets, is a clutch, which consists of the sliding member 9, keyed at 10 to the shaft 4, as clearly illustrated in Fig. 6, the said clutch being provided with the detachable pin 11, disposed to, at the proper time, engage one of the many apertures 12 formed in the freely rotatable clutch member 13. The member 13 is keyed to and carried by the sleeve 14, which is freely rotatable upon and held against outward movement upon the shaft 4 by means of the set screw collar 15. A spring 16 is interposed between the sliding member 9, and the freely rotatable member 13, and maintains the sliding member out of engagement with the rotating member, thus necessitating as will presently appear, the maintaining of the clutch member 9 toward and in coöperative relation with the member 13 when it is desired to transmit the rotary movement of the shaft 4 to the member 13.

Carried by the member 13 is the small pinion 17, which is in mesh at all times with the small pinion 18 carried integral with or fixed to the large pinion 19. These pinions 18 and 19 are keyed upon the shaft 20, which

is journaled in the two plates 21 which constitute the frame for supporting the gearing, interposed between the driven shaft 4 and the transmitting shaft 25 of the sound record carrier 100. A pinion 22, carried upon the shaft 23 which is also journaled in the plate 21, is in mesh at all times with the large pinion 19, so that motion is transmitted to the shaft 23 and through the disks 24 and 24' to the shaft 25, the opposite end of the shaft being provided with the disk 26, which is connected to the disk 26' of the sound record carrier shaft 27 of the sound record carrier 100.

By this means it will be seen that when the clutch members 9 and 13 are in engagement, and the motor of the projector mechanism is operated, that the shaft 27 will be rotated simultaneously with the gearing of the projector, and that due to the peculiar gearing carried by the plate 21, a synchronous movement due to the direct drive is produced between the projector and the sound record carrier.

In order, to provide a means, whereby the sliding clutch member 9 may be operated at the proper time, and automatically, thus dispensing with the manual actuation or starting of the sound reproducing machine with the projector mechanism, as is the usual custom, the pivoted armature 28 is provided. The upstanding arm 29 is carried by the armature 28 to abut the inner face of the spool portion of the clutch member 9, and as the armature is electrically actuated, as will presently appear, the upper end of the arm 29 will be moved outwardly to slide or shift member 9 from the left to the right, as viewed in Fig. 6, so as to connect the pin 11 with the rotating member 13 of the clutch. The arm 29 is pivoted to the lug 30 by means of the hinge connection 31, said lug 30 being carried by the brackets attached to the projector and thus forming a support for the armature and clutch operating member.

In order to lock the armature 28 and the arm 29 in clutch locking position, the bar or arm 32 is pivoted at 33 to the projector below the bracket and has its free end disposed to present the catch 34 through the aperture 35 of the arm 29 so that when the armature is electrically operated, the catch 34 will engage the outer face of the arm 29, as at 36, to maintain the sliding clutch member in mesh with the rotating member, and thus holding the projector motor operably connected to the sound record carrier 100.

As clearly shown in Fig. 5, the portion 37 of the projector mechanism, and against which the forward face of the film is held by the usual mechanism, constitutes one ground of the electrical circuit for actuating the armature 28, the electromagnet 38 being disposed to influence the armature 28

and connected by means of a bracket 39 to the projector casing and being grounded through the wire 40. The wire 41 connects the electromagnet 38 to the battery 42, which has leading therefrom the conductor 43, which is connected to the contact 44. This contact 44 is pivoted in the arm 45, and has its free end held toward the portion 37 of the projector resiliently by means of the spring 46, the said free end being disposed to engage the rear face of the moving film 47, which under normal conditions, constitutes an insulator between the free end of the contact member 44 and the metal portion 37 of the projector. Thus under normal conditions, no current will flow to the electromagnet 38.

In order to provide a means to actuate the electromagnet 38 to initially operate the clutch, so that the sound record carrier will be operated from the gearing of the projector mechanism, a metal contact 48 is connected to and carried by the film at any selected portion, this being determined according to the sound record used in connection with the film. It will thus be seen that as the metal contact 48 passes beneath the contact arm 44, that the same will close the circuit to the electromagnet 38, and thus the electromagnet will be instantly energized to attract the armature 28, and cause the arm 29 to move the sliding clutch member 9 into engagement with the rotating member 13, so that the same will rotate therewith and consequently cause the motor of the projector to synchronously operate the sound carrier.

It will thus be seen that the operative connection of the sound record carrier with the gearing of the projector, is controlled entirely through the movement of the film. Simultaneously with the movement of the armature 28 to the position as shown in Fig. 1, the catch 34 will engage and maintain the armature in such position and hold the sliding member 9 of the clutch in mesh with the rotating member so that as long as the film is being operated by the projector mechanism, although the electromagnet 38 will be deenergized, the clutch will be connected so that the projector mechanism controls the operation of the sound record carrier.

In order to hold the contact member 44 out of engagement with the back of the moving film after the electromagnet 38 has been initially energized to throw the clutch, a locking arm 49 is pivoted to engage member 44 and is moved so that its toothed edge 50 will engage the edge 51 of the supporting structure and thus maintain the contact member 44 in dotted line position, Fig. 3.

In order that the catch or trigger 32 may be electrically released, an electromagnet 52 is employed and is disposed to attract the

member 32 at the proper time and to elevate the same so as to release the catch 34 from the arm 39 and at the same time release the armature 38 to the spring 16 of the clutch so that such spring will operate to disconnect the sliding member 9 from the rotating member 13, thus automatically throwing the clutch to disconnect the projector mechanism from the sound record. In order to accomplish this, a contact device, or as many of them as is desired, such as 48' is attached to the film and disposed to engage a spring actuated contact member 44' disposed along side of the contact member 44, there being a conductor 53 led from the battery 42, to the electromagnet 52, the conductor 54 leading from the electro-magnet 52 to the contact member 44'. By this means a single battery is employed for operating both electromagnets 38 and 52, the contact members 44 and 44' in connection with the film carried contacts 48 and 48', constituting the selecting means for operating the arm 29 to cause the proper actuation of the clutch to connect or disconnect the projector mechanism to and from the sound record carrier.

By this means the sound record carrier may be connected to and disconnected from the projector mechanism at any selected point of and during the operation of the film, so that such connecting and disconnecting of the clutch is entirely controlled by the film during its passage through the projector.

The projecting end of the trigger 32 may be released manually when desired, but it is preferable that the same be released automatically and entirely through the action of the film.

In order to provide means, whereby the battery 42 is not grounded, the contact device as shown in Fig. 4, is employed, said device being actuated by the film to close its respective circuit to the electromagnets 38 or 52, there being two of the devices located adjacent each other and in the path of the moving film. In this instance, a guide roller 55 is provided and between it and the guide roller 56 passes the film 47, so that either one of the contacts 48 or 48', will cause its roller 56 to be moved away from the roller 55, and consequently elevate the lever 56' carrying the roller 56 so that the contact end 57 thereof will be placed in contact with the stationary contact 58 which is connected to and insulated from the frame of the machine.

The lever 56', as clearly illustrated in Fig. 4, is pivoted as at 57' to the frame of the machine, and is insulated therefrom as at 59, the conductor 60 being led to one side of the battery 42, while the conductors 61 and 61' displace the conductors 43 and 54 respectively, as shown in Fig. 5, and are connected to the two contacts 57 and 58 of

the respective circuit closing devices controlled by the projections 48 and 48', which when used with the structure as shown in Fig. 4, may or may not be composed of metal, they simply being projections upon either or both sides of the film that tend to separate the rollers 55 and 56 and thus mechanically close the circuit for actuating either one of the electromagnets 38 or 52.

As is often the case, several sound reproducing records are employed with a single film, and it is therefore necessary to connect the sound record carriers for successive operation, and such successive operation should be automatic, so that the desired synchronism between the projecting machine and the selected sound record carrier will be synchronous and be maintained entirely so during the operation of the projector. In order to accomplish this, a clutch 62 (Fig. 11) is disposed upon the motor shaft 27 of the first sound record carrier 100, while operably connected to this shaft through the gears 63, 64 and 65 is the main driving shaft 66 of the second sound record carrier 200, there being a clutch 66' interposed between the ends of the latter shaft and the shaft 67 of the carrier 200, so that the carrier 100 is operated first and the shaft 66 is simultaneously rotated therewith but without affecting the second sound record carrier 200.

In order to operate the clutches of the carriers 100 and 200 alternately, so that the clutch of the carrier 100 be in operable engagement, while the clutch of the carrier 200 will be out of engagement, a pivoted lever 68 is carried by the fixed portion of the carrier 100 and in the path to be engaged by the stylus 69 of the reproducer 70, said lever operating the two yokes 71 and 71' extending in opposite direction and connected to both of the clutches, so that when operated by the stylus in opposition to its spring 72, the carrier 100 will be disconnected from the shaft 27, while the carrier 200 will be connected for operation therefrom. By this means the successive action of the sound record carriers is produced, and it will be noted that this action may be continued successively through any number of carriers as is desired, it, however, having been ascertained by practice that two sound record carriers are all that are necessary.

As clearly illustrated in Figs. 8, 9 and 10, a mechanism for controlling the operation of the clutch member 9 mechanically instead of electrically is provided, the film 47' in this instance being provided with an elongated slot or slots 73, as clearly illustrated in Figs. 9 and 10, so that when said slot is placed in registration with the roller 74 carried upon the inner free end of the lever 75 which is carried by the bracket 76, as clearly illustrated in Fig. 9, the said lever will release the notch 77 formed in the free end 78

thereof from the hooked end 79 of the clutch actuating rod 80. This rod 80 is provided with a button 81 and has mounted thereon the spring 82, which has a normal tension to move the button 81 away from the bracket 76 to engage the free end 82' of the lever 83. This lever 83 is pivotally connected to the projector casing and is connected by means of a pin and slot connection 84 to the upper end of the bell crank lever 85 which is also pivotally connected to the projector casing. The lower end 86 of this bell crank lever 85 is disposed in operable relation to the clutch member 9, to, when actuated by the spring released trigger 80, move the clutch 9 into engagement with the clutch member 13 and thus operably connect the sound record carrier with the projector. The two springs 87 and 88 which are connected to the lever 75 normally maintain the same in a neutral position, so that no undue pressure upon the roller 74 and the film 47', will result.

When the film in this instance automatically releases the clutch member 9, a similarly constructed mechanism as shown in Fig. 9, engages the rod 80, operating the lever 83 in an opposite direction, however, as is clearly apparent.

In this instance, the trigger 80 may be manually set and the clutch member 9 manually released at the end of a film, the operation of throwing the clutch to connect the sound record carrier with the projector mechanism is however automatic.

The mechanism as shown in Fig. 9 is connected to and carried by the hinged member of the projector, and the lever 83 is pivoted off to one side thereof, so as not to interfere with the opening of the same, said lever also being further pivoted so that the same may be readily lifted from engagement with the projector mechanism so as not to interfere with the proper positioning of the film.

Although mechanical clutch devices are illustrated to connect successively the sound record carriers 100 and 200, it is apparent that the electrical devices may be operated to operate the clutches without departing from the present invention, it simply being the intention to produce a means whereby one carrier will successively connect another and disconnect itself so that there will be proper harmony between the actuation of the film and the sound record upon the carrier, it being essential that the film cause the proper actuation of the clutch of the synchronizing device with the sound record carrier, to thus insure the proper harmonious action between the sound waves and the images thrown upon the screen.

It is apparent from the present invention that the necessity of recording the voice and sound simultaneously with the acting of the play or other performance is obviated,

and rendered unnecessary, and that a record produced by a star or star cast of performers upon a sound recording machine may be attached to and controlled by a film either acted by the same performers or imitators thereof, so that the voices of the performers will be operated synchronously with the gestures thereof, such synchronism being entirely due to the moving of the film and the connecting and disconnecting of the clutch members 9 and 13 through the film itself.

It is also apparent, as before stated, that should the film break at any time, a necessary section of film, as is the present custom in repairing films, may be cut therefrom and a similarly sized section be inserted so as to insure the synchronous action between the film and sound record, and without totally destroying the film or rendering it useless as is the case where the sound reproducing record is taken simultaneously with the photographing of the performers.

It is obvious that many devices for performing or establishing the connection of the motor of the projector with the sound record carrier may be resorted to and still be within the spirit of the present invention, which resides mainly in the fact that the film during the movement thereof through the projector controls the connection and disconnection of the sound record carrier to and from the projector.

In Fig. 12 is illustrated another method of successively operating the sound record carriers, the shaft 27^a, having mounted thereupon the two clutches C and C', which are made similar to the clutch members 9-13. The freely rotatable member of each is connected to the gears (not shown), of a sound record carrier.

The switches 57' and 58' are controlled by the projections 48 and 48' of the film, projection 48 closing the switch 57', which closes the circuit including the conductor 101, the battery 102, the conductor 103, the electro-magnet 38', the conductor 104, the electro-magnet 52^a, and the conductors 105 and 106. This energizes both electro-magnets 38' and 52^a, and attracts the armature 28 to cause arm 29' to throw the clutch C, the armature catch 32' locking the arm 29' as heretofore described. As electro-magnet 38^a, is inactive the energization of the electro-magnet 52^a will not affect the clutch C', and thus the record carrier controlled by the clutch C will be operated. As the film approaches the point for changing to the clutch C', the projection 48' thereof passes between the rollers 55 and 56, and closes the switch 58', closing the following circuit to throw out the clutch C and throw in the clutch C'. This circuit includes the conductor 107, the battery 108, the electro-magnet 52', the conductor 109, the electro-magnet 38^a, and the conductors 110 and 111. Thus the electro-

magnet 52' releases the armature catch 32' to permit the arm 29' to throw out the clutch C, while the electro-magnet 38^a, attracts the armature 28^a to cause the arm 29^a to throw the clutch C', the armature catch 32^a, locking the arm 29^a.

From the foregoing description, taken in connection with the drawings, it is evident that means is provided whereby the moving film controls the clutch for determining the time of actuation of the sound record carriers, as for instance, the sound reproducing record, the starting and stopping of the carrier being automatically controlled by the film and operated solely by the projector mechanism.

In putting into practice the present invention, it is essential that the sound record carrier, which may be the mandrel of a cylinder record machine or the disk platform of a disk machine, be operated from a standstill to full speed and directly from the operating mechanism of the projector, which projector may be operated by hand or by an electric motor as may be found most expedient and desirable. It will thus be seen that the usual motor with a sound reproducing machine is entirely dispensed with, the sound record carrier in the present instance being an adjunct of the projector mechanism, which being the heavier mechanism to operate, is primarily operated gradually to full speed and controlled to operate the sound record carrier from a standstill to full speed at any desired or selected point of the film.

It has been found in practice, that the method of starting a projector mechanism slowly to obtain the desired speed for the proper movement of the film, is best, so that no undue strain will be thrown upon the film, and that as the mechanism for operating the film is a much heavier mechanism than that for operating the sound record, either of the cylindrical or disk type, it is therefore essential to control the latter from the projector mechanism, and not operate the projector mechanism from the sound reproducing machine. Where the sound reproducing machine is employed as the motor or mechanism for operating the projector, the too sudden strain thrown upon the gearing of the projector, tends to, and often does tear the film, and further as the sound record has attained full speed, it is impossible to bring the film from an inert position to full speed or to the necessary speed to insure synchronous action. This installation requiring the projector to be operated from the sound record reproducing machine is impractical and as far as practice has demonstrated, useless. The reverse operation, however, and as herein set forth, has been demonstrated to be the best possible way in which to control the operation of

the two records, that is the film and the disk or cylinder, so that the proper synchronous action between the projection of the image upon the screen and the sound is maintained and secured, the operating of the cylinder or disk being of less resistance than the pull placed upon the film. Therefore such a light or easily operated mechanism is moved readily and practically connected and disconnected to and from the operating mechanism of the projector, without throwing any apparent strain thereupon, either when the projector is operated manually, as by the crank as illustrated, or by an electric motor. Further as the operating mechanism receives the strain of the sound record carrier, no strain is placed upon the delicate film.

It is therefore the present intention to employ the record carrier as an adjunct to the projector mechanism of a motion picture machine and to solely operate such record carrier by and from the projector mechanism, the power communicating means between the two, being as herein described provided with a positive clutch which is actuated solely through the instrumentality of the moving film.

What is claimed is:

1. The combination with a motion picture projector, a film, independent circuit controlling members carried by the film, and a record carrier, of a driving element for the record carrier, a clutch, an electromagnet for causing the engagement of the clutch, and another electromagnet for causing disengagement of the clutch, independent circuits including a source of electrical energy, one of the electromagnets being included in each circuit, and switches, one in each circuit, one circuit controlling member serving to close one switch to energize the clutch engaging electromagnet and the other circuit controlling member serving to close the other switch to energize the clutch disengaging electromagnet.

2. The combination with a motion picture projector, a film, independent circuit controlling members carried by the film, and a record carrier, of a driving element for the record carrier, a clutch, electromagnets, one for causing engagement of the clutch and the other for causing disengagement of the clutch, independent electrical circuits including a source of electrical energy, and each including a switch, there being one electromagnet in each circuit, and independent switch controlling members carried by the motion picture projector film, whereby one circuit controlling member closes one switch to energize the clutch engaging electromagnet and the other circuit controlling member closes the second switch to energize the clutch disengaging electromagnet.

3. The combination with a motion picture

projector, a source of electrical energy, a film controlled switch, and a circuit including the source of electrical energy and the switch, of a sound record carrier, two co-operable clutch members operably connected one to the projector and the other to the sound record carrier, a spring for releasing the clutch members, an electromagnetically controlled means for operating one of the clutch members against the action of the spring, the electromagnet of which is in the circuit, whereby, when the circuit is closed by the film, the electromagnet is energized and the clutch members engaged to directly connect the sound record carrier with the projector, a lock for holding the clutch members engaged, and means for releasing the lock to release the clutch members.

4. The combination with a motion picture projector, a source of electrical energy, a film controlled switch, and a circuit including the source of electrical energy and the switch, of a sound record carrier, two co-operable clutch members operably connected one to the projector and the other to the sound record carrier, a spring for releasing the clutch members, an electromagnetically controlled means for operating one of the clutch members against the action of the spring, the electromagnet of which is in the circuit, whereby when the switch is closed by the film the electromagnet is energized and the clutch members engaged to directly connect the sound record carrier with the projector, a lock for holding the clutch members engaged, and electrical means controlled by the film for releasing the lock to free the clutch members to action of the spring and to disconnect the sound record carrier from the projector.

5. The combination with a motion picture projector, a film, a projection carried by the film, a source of electrical energy, a switch closed by the projection on the film, and a circuit including the source of electrical energy and the switch, of a sound record carrier, two coöperable spring separated clutch members operably connected one to the projector and the other to the sound record carrier, an electromagnetically controlled means for operating one of the clutch members to engage the other member, the electromagnet of which is in the circuit, whereby, when the switch is closed by the projection on the film, the electromagnet is energized and the clutch members engaged to directly connect the sound record carrier with the projector, a lock for holding the clutch members engaged, and means for releasing the lock to free the clutch members.

6. The combination with a motion picture projector, a film, a projection carried by the film, a source of electrical energy, a switch closed by the projection on the film, and a

circuit including the source of electrical energy and the switch, of a sound record carrier, two coöperable spring separated clutch members operably connected one to the projector and the other to the sound record carrier, an electromagnetically controlled means for operating one of the clutch members to engage the other member, the electromagnet of which is in the circuit, whereby, when the switch is closed by the projection on the film, the electromagnet is energized and the clutch members engaged to directly connect the sound record carrier with the projector, a lock for holding the clutch members engaged, and electrical means controlled by the film for releasing the lock to free the clutch members and disconnect the sound record carrier from the projector.

7. The combination with a motion picture projector, a sound record carrier, and means for operating the projector and carrier; of a clutch for connecting said carrier to the operating means; means controlled by the projector for engaging the clutch; means for disengaging the clutch; means for locking the clutch engaged; and means controlled by the projector for releasing the locking means.

8. The combination with a motion picture projector, a film, a sound record carrier, and means for operating the projector and carrier; of a clutch for connecting said carrier with the operating means; means controlled by the film for engaging the clutch; means for disengaging the clutch; means for locking the clutch engaged; and means controlled by the film for releasing the locking means.

9. In combination, a motion picture projector, a sound record carrier, a transmission mechanism between the two to maintain the speeds of the two in the proper ratio, a clutch in said transmission mechanism, means controlled by the projector for engaging the clutch, means for disengaging the clutch, an automatic lock for the clutch, and means controlled by the projector for operating the lock to release the clutch.

10. In combination, a motion picture projector, a sound record carrier, a transmission mechanism between the two to maintain the speeds of the two in the proper ratio, a clutch in said transmission mechanism, electromagnetic means controlled by the projector for engaging the clutch means for disengaging the clutch, an automatic lock for the clutch, and electro-magnetic means controlled by the projector for operating the lock to release the clutch.

11. In combination, a motion picture projector, a film operated thereby, a sound record carrier, a transmission mechanism between the projector and sound record carrier to maintain the speeds of the two in proper

ratio, a clutch in said transmission mechanism, means controlled by the film for engaging the clutch, means for disengaging the clutch, an automatic lock for the clutch, and means also controlled by the film for operating the lock to release the clutch.

12. In combination, a motion picture projector, a film operated thereby, a sound record carrier, a transmission mechanism between the projector and sound record carrier to maintain the speeds of the two in the proper ratio, a clutch in said transmission mechanism, an electro-magnetic means controlled by the film for engaging the clutch, means for disengaging the clutch, an automatic lock for the clutch, and a second electro-magnetic means controlled by the film for operating the lock to release the clutch.

13. The combination with a motion picture projector, a film operated thereby, and a sound record carrier, of mechanism for operating the record carrier from the projector, including means controlled by the film for connecting such mechanism to the projector, means for disconnecting such mechanism, means for locking the first named means in closed position, and another mechanism controlled by the film for releasing the locking means, whereby the sound record carrier is alternately started and stopped in its action relatively to the moving projector.

14. In an apparatus of this character, the combination of a motion picture projector, a film having a plurality of circuit closing means carried thereby, a sound record carrier, speed reducing and transmitting mechanism including a clutch interposed between the projector and sound record carrier, and

whereby the sound record carrier is operated by the projector in the proper ratio of speed, yielding automatic means for disengaging the clutch, two electro-magnets for controlling the clutch, one to engage it and the other to insure its release, two electrical circuits, each including a source of electrical energy and its electromagnet, and two switches one in each circuit and in the path to be closed by its respective circuit closer of the film.

15. In an apparatus of this character, the combination of a motion picture projector, a film having a plurality of circuit closing means carried thereby, a sound record carrier, speed reducing and transmitting mechanism including two spring released clutch members interposed between the projector and sound record carrier, and whereby the sound record carrier is operated by the projector in the proper ratio of speed, a lock for holding the clutch members engaged, two electromagnets one to move one clutch member into engagement with the other member and the other to release the lock and free the clutch member, two electrical circuits, each including a source of electrical energy and one of the electromagnets, and two switches one in each circuit and in the path to be closed by its respective circuit closer of the film.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HARRISON W. ROGERS.

Witnesses:

SELINA WILLSON,
I. E. SIMPSON.

tone arm for talking machines.

1,251,340 ----- P. Catucci,
Patented Dec. 25, 1917.
Filed Nov. 9, 1915.

1,251,340.

The image contains several technical drawings of mechanical parts, labeled as follows:

- Fig. 1:** A side view of a component with a circular head and a long, tapered neck. It features a central longitudinal slot and various internal and external features labeled with numbers 1 through 31.
- Fig. 2:** A side view of a component with a circular head and a long, tapered neck, similar to Fig. 1 but with different internal features, labeled with numbers 1 through 19.
- Fig. 3:** A side view of a component with a circular head and a long, tapered neck, labeled with numbers 1 through 12.
- Fig. 4:** A cross-sectional view of a component, showing internal features and a central longitudinal slot, labeled with numbers 1 through 26.
- Fig. 5:** A side view of a component with a circular head and a long, tapered neck, labeled with numbers 1 through 18.
- Fig. 6:** A cross-sectional view of a component, showing internal features and a central longitudinal slot, labeled with numbers 1 through 18.
- Fig. 7:** A side view of a component with a circular head and a long, tapered neck, labeled with numbers 1 through 18.

Pliny Catucci INVENTOR.

BY
Louis M. Sanders ATTORNEY[®].

UNITED STATES PATENT OFFICE.

PLINY CATUCCI, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO OTTO HEINEMAN PHONOGRAPH SUPPLY CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

tone-arm for talking-machines.

1,251,340.

Specification of Letters Patent.

Patented Dec. 25, 1917.

Application filed November 9, 1915. Serial No. 60,479.

To all whom it may concern:

Be it known that I, PLINY CATUCCI, a citizen of the United States, and residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Tone-Arms for Talking-Machines, of which the following is a specification.

In modern practice in the manufacture of talking machines, it is quite common to permit the entire weight of the swinging tone arm and sound box to rest, through the medium of the needle, upon a record disk. This overhanging weight varies according to the make and structure of the tone arm and sound box. Some manufacturers consider that a heavy sound box will produce better results than one of lighter weight; the result is that there is no uniformity in the weight of the parts which are supported by the reproducing needle. It is obvious, therefore, that a heavy sound box and tone arm will have a greater frictional drag upon the surface of the record, with the corresponding excess of wear in the sound grooves than would be found were a lighter sound box and tone arm used.

The purpose of my present invention is to provide a tone arm for talking machines with means for adjustably relieving the sound box needle of a portion, or all of the weight of the tone arm, and a portion of the weight of the sound box, so that the pressure upon the surface of the record through the sound box needle may be very materially relieved and the life of the record correspondingly prolonged. The tone arm also embodies a novel form of construction in the swinging or swivel bearing of the tone arm with the stationary sleeve support therefor. It also is provided with detachable sound box tubes of a character to permit the same sound box to be used in connection with either the so called Berliner records, or the so called Edison records, that is to say,—records wherein the sound groove is a zig-zag spiral of uniform depth, or where the record groove is a spiral of varying depth.

In carrying out my invention, I make use of the structure substantially as illustrated in the accompanying drawings, wherein—

Figure 1, is a plan view of a complete

tone arm as constructed and ready for attachment to a talking machine case.

Fig. 2, is a side elevation of the same.

Fig. 3, is a vertical end elevation.

Fig. 4, is a full sized vertical section on line 4—4 of Fig. 1.

Fig. 5, is a view of the tone arm detached from the swivel support.

Fig. 6, is a corresponding view of the swivel elbow showing the location of the stop-slot.

Fig. 7, is a detached view of a sound box tube for use with so called Edison records.

Similar letters of reference refer to like parts throughout the specification and drawings.

The tone arm proper consists essentially of the three parts, namely,—the supporting bearing 1, the elbow section 2, and the tone arm section 3. The supporting member 1 consists of a tube, having its lower end slightly in-turned as at 4, and its upper marginal edge beveled at an angle of 45 degrees, as at 5. I may also provide a circumferential bead as at 6, which serves not only to ornament the device, but also to stiffen the bearing support. The flange member 7 consists of a disk with a central opening and an up-turned flange, as 8, by which it is secured to the external surface of the tubular member 1. The elbow member 2 consists of a casting as 9, having its lower end provided with a reduced portion as 10, into which is inserted the reduced tubular end 11, of the conduit 12. The upper reduced end 11 of this conduit is rigidly secured to the interior of the elbow extension 10, and when in the position illustrated in Fig. 4, the lower end of the conduit 12 neatly fits the in-turned end 4 of the supporting tube 1. The upper inclined margin 5, of the tubular member 1, fits the corresponding shoulder upon the casting 9.

In order to hold the parts together, I provide the conduit 12 with a circumferential slot 13, into which extends a screw 14, which is rigidly secured in position by screwing the same through the flanged portion of the disk 7, and through the tubular support 11. This method firmly secures the elbow member 2 to the supporting member 1, and at the same time permits a limited oscillatory movement of the conduit 12

within the tubular supporting member 1. The opposite end of the elbow casting 9, is provided with a bearing 15, to receive the corresponding extended bearing 16 of the elbow member 17. Passing axially through the mating elbow castings 9 and 17, is the connecting rod 18, which is provided with a head 19 at one end, and with a circumferential groove 20 near its opposite end. The screw 21, extending through the boss 22, on the casting 9, into the groove 20, serves the double purpose of rigidly securing the rod 18, both against withdrawal and also against rotation. Mounted upon the rod 18 is a collar 23, rigidly secured thereto, and upon said collar is rigidly connected one end of a coiled spring 24, said coiled spring embracing the rod 18 to a point adjacent to the bearing portions 15 and 16 of the castings 9 and 17. The free end of the spring 25 is then carried radially outward through an aperture in the bearing 16, extending slightly beyond the circumferential surface of the same into a slot 26, which latter is cut into the bearing 16 of the casting 9. The head 19 of the rod 18, is knurled so as to afford a good hand-hold, and when the screw 21 is slightly released, the spring 24 may be put under a greater or lesser tension as desired, through the medium of the head 19. When the desired tension is obtained, the screw 21 may again be set home and thus the rod 18 will be rigidly held in place. In order to relieve the overhanging tone arm 3, of a portion of its weight and also of the weight of the sound box secured thereon, the tension in the spring 24 is such as to give the tone arm a normal bias upward, as in the direction of the arrow shown in Fig. 2. As above indicated, this normal bias may be adjusted to any degree within the limits of the spring 24, or if desired for any reason whatsoever, the bias may be reversed and the normal tendency of the tone arm 3 may be made to bear more heavily upon a record.

The elbow casting 17 is provided with the usual tubular extension 27, said tubular extension being provided with a positioning slot 28, to receive a pin 29, upon the sound box elbow tube 30. The sound box 31 may be of any usual or preferred type.

When Berliner records are used in a talking machine in connection with my tone arm, as above indicated, the elbow tube 30 is used, and the sound box 31 is located with the plane of its diaphragm perpendicular with the plane of the record disk, but where a record of the Edison type is used, the elbow tube 32 is substituted for the elbow tube 31, so that the plane of the diaphragm in the sound box shall intersect the plane of the disk at an angle of about 45 degrees. It requires, therefore, only the

change of the sound box elbow tubes 30 and 32 in order to play any of the disk records now on the market.

The particular form of swivel bearing for the swinging tone arm, as shown in detail in Fig. 4, possesses many advantages, for example, the lower in-turned end 4 of the supporting member 1, affords a very efficient bearing for the lower end of the swiveling conduit 12. The casting 9 being provided with a beveled shoulder for engagement with the beveled edge 5 of the supporting member 1, makes the device self centering, and when in operation, the lateral swing of the tone arm 3 meets with substantially no frictional drag and consequently there is no rattle among the parts.

By properly adjusting the spring 24, as hitherto indicated, any degree of pressure within the limits of the device may be brought to bear upon the record through the stylus needle. This pressure may be, as above indicated, just within the limits of the spring 24. The carrying of the end of the spring 25 out through an aperture in the extension bearing 16 into the slot 26, of the casting 9, serves as an efficient means for limiting the upward swing of the tone arm 3 under the influence of the spring 24.

It might be thought that the introduction of the rod 18, and the spring 24, into the sound passage would interfere in some way with the sound waves; in practice, however, I find that there is no diminution in volume nor variation in tone over that coming from a tone arm in which there is no rod such as 18.

From the description it will be readily seen that the tone arm 3 may swing in a horizontal plane about the vertical axis of the supporting member 1, and at the same time it may swing in a vertical plane about the rod 18, which is the common axis of the two mating elbows 9 and 17. By properly adjusting the tension of the spring 24, the tone arm may be given a normal upward bias, as hitherto indicated, against the action of gravity upon said tone arm and sound box. This upward bias may be made sufficient to relieve either wholly or partially the record tablet of the weight of the sound box and overhanging tone arm. The ends of the slot 26 serve to limit the oscillation of the tone arm through the extremity of the spring 25, where it protrudes through the bearing 15 into the slot 26.

It will thus be seen that I have accomplished the objects set forth, in a structure at once simple and not likely to disarrangement in ordinary use.

I claim:

1. In a tone arm for talking machines, the combination of a pair of mating elbow castings having a common horizontal axis, means for securing said castings together to permit

- one of them to oscillate upon the other about their common axis in a vertical plane, and means for giving the oscillating elbow a constant normal bias in the upward direction.
2. In a tone arm for talking machines, the combination of a pair of mating elbow castings having a common horizontal axis, a connecting rod passing through said elbows in their common axis, about which one of said elbows may oscillate in a vertical plane, and means for giving said oscillating elbow a constant normal bias in the upward direction.
3. In a tone arm for talking machines, the combination of a pair of mating elbows having a common horizontal axis, means for securing said elbows together to permit one of them to oscillate upon the other about their common axis, and resilient means for giving said oscillating elbow a constant normal bias in the upward direction.
4. In a tone arm for talking machines, the combination of a pair of mating elbows, having a common horizontal axis, a connecting rod passing through said elbows in their common axis, about which one of said elbows may oscillate in a vertical plane, and resilient means for giving said oscillating elbow a constant normal bias in the upward direction.
5. In a tone arm for talking machines, the combination of a pair of mating rectangular elbows having a common horizontal axis, a connecting rod passing through the common axis of said elbows about which they may relatively oscillate in a vertical plane, a spring connecting said rod to one of said elbows, and means for adjustably and rigidly securing said rod to the other elbow to adjust the tension of said spring to give said elbows a constant normal oscillatory bias in the upward direction.
6. In a tone arm for talking machines, the combination of a pair of mating elbow castings having a common horizontal axis, means for securing said castings together to permit one of them to oscillate upon the other about their common axis in a vertical plane, means for giving the oscillating elbow a constant normal bias in the upward direction, and means for limiting the degree of said oscillation.
7. In a tone arm for talking machines, the combination of a pair of mating elbow castings having a common horizontal axis, a connecting rod passing through said elbows in their common axis, about which one of said elbows may oscillate in a vertical plane, means for giving said oscillating elbow a constant normal bias in the upward direction, and means for limiting the degree of said oscillation.
8. In a tone arm for talking machines, the combination of a pair of mating elbows having a common horizontal axis, means for securing said elbows together to permit one of them to oscillate upon the other about their common axis in a vertical plane, resilient means for giving said oscillating elbow a constant normal bias in the upward direction, and means for limiting the degree of said oscillation.
9. In a tone arm for talking machines, the combination of a pair of mating elbows having a common horizontal axis, a connecting rod passing through said elbows in their common axis, about which one of said elbows may oscillate in a vertical plane, resilient means for giving said oscillating elbow a constant normal bias in the upward direction, and means for limiting the degree of said oscillation.
10. In a tone arm for talking machines, the combination of a pair of mating rectangular elbows, a connecting rod passing through the common axis of said elbows, about which they may relatively oscillate, a spring connecting said rod to one of said elbows, means for adjustably and rigidly securing said rod to the other elbow to adjust the tension of said spring to give said elbows a constant normal oscillatory bias in one direction, and means for limiting the degree of said oscillation.
11. In a tone arm for talking machines, the combination of a tubular supporting member having a vertical axis and having an inclined bearing at its upper end and an inturned bearing at its lower end, a tubular swiveling member within said supporting member in engagement with said lower inturned bearing, and having an inclined shoulder bearing in engagement with the upper bearing of said supporting member.
12. In a tone arm for talking machines, the combination of a tubular supporting member having a vertical axis and having an inclined bearing at its upper end and an inturned bearing at its lower end, a tubular swiveling member extending through said supporting member in engagement with said lower inturned bearing and having an inclined shoulder bearing in engagement with the upper bearing of said supporting member, and means for limiting the oscillations of said swiveling member within said supporting member.
13. In a tone arm for talking machines, the combination of a tubular supporting member having a vertical axis and having a horizontal elbow at its upper end, a tubular tone arm having an elbow at one end, said elbow in oscillatory engagement with the elbow on said supporting member, a connecting rod passing through said elbows in their common axis and rigidly, but adjustably secured to said supporting member whereby said tone arm may oscillate in a vertical plane, a spring coiled about said

rod and having one end secured thereto and its other end engaging said tone arm for giving said oscillating tone arm a constant normal upward bias.

- 5 14. In a tone arm for talking machines, the combination of a tubular supporting member having a vertical axis and having a horizontal elbow at its upper end, a tubular tone arm having an elbow at one end,
10 said elbow in oscillatory engagement with the elbow on said supporting member, a connecting rod passing through said elbows in their common axis and rigidly, but adjustably secured to said supporting member

whereby said tone arm may oscillate in a vertical plane, a spring coiled about said rod and having one end secured thereto and its other end engaging said tone arm for giving said oscillating tone arm a constant normal upward bias, and means for limiting the
20 degree of said oscillation.

In testimony whereof, I have hereunto set my hand and affixed my seal this 6th day of November, 1915.

PLINY CATUCCI. [L. s.]

In presence of—

L. M. SANDERS,

F. L. GREEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX.

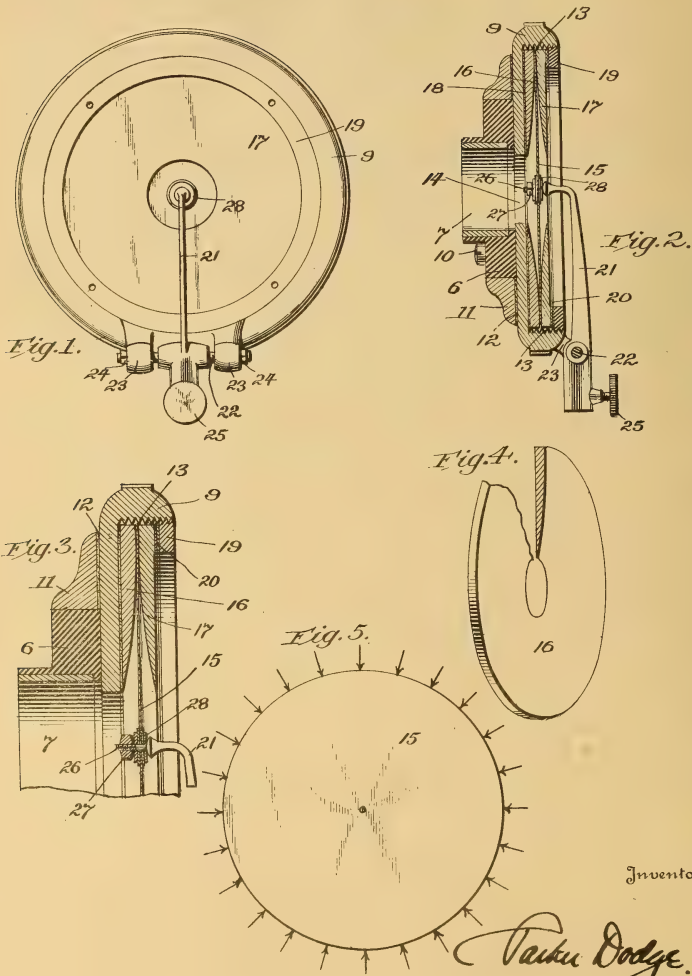
1,251,355 ----- P. Dodge.
Patented Dec. 25, 1917.
Filed May 18, 1915.

P. DODGE,
SOUND BOX.

APPLICATION FILED MAY 18, 1915.

1,251,355.

Patented Dec. 25, 1917.



Inventor

Park Dodge.

UNITED STATES PATENT OFFICE.

PARKER DODGE, OF WASHINGTON, DISTRICT OF COLUMBIA.

SOUND-BOX.

1,251,355.

Specification of Letters Patent.

Patented Dec. 25, 1917.

Application filed May 18, 1915. Serial No. 28,911.

To all whom it may concern:

Be it known that I, PARKER DODGE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

This invention relates to sound boxes for gramophones, graphophones and the like and the principal features of novelty reside in the mounting of the diaphragm.

The invention has a special utility and function when combined with the characteristic features of the sound box described and claimed in my copending application Serial Number 12,578, filed March 6, 1915. Accordingly, in order to disclose the best embodiment known to me, and to permit the making of specific claims to that combination, I hereinafter describe the invention as applied to the structure of my said application. I do not, however, limit myself thereto, as certain advantages of the invention may be secured with other sound boxes in which the diaphragm is rigidly mounted.

The invention consists in a sound box in which the diaphragm is rigidly mounted and held under a uniformly distributed radial compressive stress acting in the plane of the diaphragm. A diaphragm so mounted is peculiarly inert and devoid of inherent resonance; it vibrates freely with a relatively wide amplitude, giving an increased volume and roundness of tone, and an increased response to sibilants and "breathy" sounds.

I shall now describe the invention as applied to a gramophonic reproducer, in which it has been successfully used. Those skilled in the art will appreciate its applicability to other types of reproducer and to recorders by the making of simple substitutions well known in the art.

Referring to the drawings:

Figure 1 is a front elevation of a sound box having my invention applied;

Fig. 2 is an axial section thereof;

Fig. 3 is an enlarged fragmentary view similar to Fig. 2;

Fig. 4 is a perspective view of a diaphragm clamping ring of preferred form, a part of the ring being shown broken away to clearly show the form; and

Fig. 5 is an elevation of a diaphragm with the stresses to which it is subjected diagrammatically indicated.

In the drawings 6 represents the usual

rubber connector sleeve for connecting the sound box or reproducer to the goose neck or tone arm of the machine on which it is to be used. The sleeve has the usual brass lining tube 7 which fits over the end of the goose neck, and is provided with the usual bayonet lock pin (not shown). The cup-shaped body 9 of the sound-box, which is of metal, is held to the connector sleeve 6 by means of screws 10 and by means of a metal weight ring 11 which closely embraces the sleeve 6 and is sealed to the rear face of the box-body 9 with a thin layer of bees-wax or similar plastic adhesive 12. The purpose of this weight is to damp any vibrations which might be set up in the box-body 9.

The box-body 9 is internally threaded as indicated at 13 and is provided with an aperture 14 leading through connector sleeve 6 to the goose neck or tone arm.

The diaphragm 15 which preferably is of mica is clamped between two rings 16 and 17 of substantially identical form, each having a central aperture which I prefer to make of substantially the size of aperture 14. The face of each of the rings 16 and 17 toward the diaphragm is a surface of revolution. The generating curve is tangent or approximately tangent to the contacting face of the diaphragm at or near its periphery and curves gradually away from such face toward the center of the diaphragm. The clearance between the opposed faces of the rings 16 and 17 need be only slightly greater than the maximum amplitude of vibration of the diaphragm and is somewhat exaggerated in the drawing. The rings 16 and 17 may be of any relatively rigid material. The best results have been secured with celluloid but successful use has been made of metals, for example aluminum and brass. The brilliancy of tone seems to increase with the hardness of the material used for the rings.

The rear ring 16 is sealed to the rear wall of the box-body 9 by a thin layer 18 of bees-wax or similar adhesive plastic and the front ring 17 is pressed toward it by a nut ring 19. Paper gaskets 20 may be interposed between front ring 17 and nut ring 19, partly to equalize the pressure by their resiliency and partly to permit nut ring 19 to turn more freely on ring 17 in assembling the sound-box.

The vibrator or stylus arm 21 is mounted on cone pivot screws 22 which are threaded

in lugs 23 and locked with check nuts 24. It has the usual needle socket in which needles may be clamped by the set screw 25. The stylus arm 21 is connected to the center of the diaphragm 15 by means of a threaded stud 26 and nut 27, the usual washers 28 being used to distribute the pressure.

The structure so far described forms the subject matter of my application above identified and consequently is not broadly claimed herein.

To apply my invention to such a sound box, it is necessary simply to clamp the diaphragm 15 between the rings 16 and 17 in such a way that it will be held by them under a radially acting compressive stress. Any preferred method of securing this result may be adopted. One convenient method is loosely to assemble the diaphragm 15, clamping rings 16 and 17, washers 20 and nut ring 19 in the box-body 9, then to deflect the diaphragm an amount approximating the maximum deflection of the diaphragm desired in reproducing from records, and finally while holding the diaphragm so deflected to set up the nut ring 19 until the periphery of the diaphragm is clamped fast between the rings 16 and 17. This holds the periphery in the contracted state resulting from the deflection of the diaphragm. This method forms a part of the subject matter of my copending application, Serial Number 28,910, filed May 18, 1915, and hence is not claimed herein.

In Fig. 5 I illustrate diagrammatically the diaphragm and the stresses to which it is subjected. The arrows are intended to illustrate by their close spacing a uniformly distributed stress acting radially at all points around the periphery or line of clamping of the diaphragm.

The imparting of this compressive stress to a rigidly mounted diaphragm seems invariably to increase the roundness and loudness of the tone produced by such diaphragm, and renders certain sounds such as sibilants clearly audible. The increased sensitiveness of the diaphragm, when so stressed, increases the tendency to whine and blast under some conditions, but I have found that the use of the conoidally recessed rings of my prior application completely neutralizes this effect. Furthermore the stressed diaphragm when applied to the sound box of my prior application markedly increases the range of records which may be reproduced therewith.

Thus the invention resides first in the stressed diaphragm, and second in the combination of this with clamping means having conoidally recessed proximate clamping faces. Different methods and means for securing the stressing and different mechanical expressions of the clamping members, etc., are possible, are contemplated and fall within the scope of the invention. The clamping

members may be made of materials of different degrees of resiliency, provided they are substantially rigid.

Having thus described the invention what I claim is:—

1. In a sound box, the combination of a box body; a vibrator mechanism; a substantially rigid support for the peripheral portion of a diaphragm, carried by said box body; and a flexible diaphragm held by said support in a state of radial compression, and operatively connected with said vibrator mechanism.

2. In a sound box, the combination of a box body; a vibrator mechanism; a substantially rigid support engaging the peripheral portion of a diaphragm and carried by said box body; and a mica diaphragm held by said support in a state of radial compression, and operatively connected with said vibrator mechanism.

3. In a sound box, the combination of a box body; a vibrator mechanism; relatively rigid clamping means mounted in said box body for exerting a clamping action upon the faces of a diaphragm at or near its periphery; and a flexible diaphragm held by said clamping means in a state of radial compression, and operatively connected with said vibrator mechanism.

4. In a sound box, the combination of a box body; a vibrator mechanism; celluloid clamping means mounted in said box body for exerting a clamping action upon the faces of a diaphragm at or near its periphery; and a flexible diaphragm held by said clamping means in a state of radial compression, and operatively connected with said vibrator mechanism.

5. In a sound box, the combination of a box body; a vibrator mechanism; clamping means of relatively rigid material mounted in said box body and formed with opposed conoidally recessed clamping faces for receiving an interposed diaphragm, said faces being so formed as each to have an annular area of contact with the proximate face of such diaphragm at or near the periphery thereof, and to curve gradually away from said diaphragm toward the center; and a diaphragm held by said clamping means in a state of radial compression, and operatively connected with said vibrator mechanism.

6. In a sound box, the combination of a box body; a vibrator mechanism; clamping means of relatively rigid but elastic material mounted in said box body and formed with opposed conoidally recessed clamping faces for receiving an interposed diaphragm, said faces being so formed as each to have an annular area of contact with the proximate face of such diaphragm at or near the periphery thereof, and to curve gradually away from said diaphragm to

ward the center; and a diaphragm held by said clamping means in a state of radial compression, and operatively connected with said vibrator mechanism.

5 7. In a sound box, the combination of a box body; a vibrator mechanism; clamping means of celluloid mounted in said box body and formed with opposed conoidally recessed clamping faces for receiving an in-
10 terposed diaphragm, said faces being so formed as each to have an annular area of contact with the proximate face of such diaphragm at or near the periphery thereof, and to curve gradually away from said dia-
15 phragm toward the center; and a diaphragm held by said clamping means in a state of radial compression, and operatively connected with said vibrator mechanism.

20 8. In a sound box the combination of a relatively rigid diaphragm mount having an annular diaphragm supporting area merging into a central recess which flares gradually away from the face of the supported

diaphragm toward the center; means for clamping the periphery of a diaphragm 25 against said mount; a flexible diaphragm held by said clamping means in a state of radial compression; and a suitable vibrator mechanism for said diaphragm.

9. In a sound box the combination of a 30 relatively rigid diaphragm mount having an annular diaphragm supporting area merging into a central recess which flares gradually away from the face of the supported diaphragm toward the center; a second dia- 35 phragm mount having a surface configuration similar to that of the first diaphragm mount; means for forcing said mounts together; a flexible diaphragm held between said mounts in a state of radial compression; and a suitable vibrator mechanism for 40 said diaphragm.

In testimony whereof I have signed my name to this specification.

PARKER DODGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

NUMERICAL LIST
OF
DESIGN PATENTS.

GRAPHOPHONE PATENTS - VOLUME XIX.

1917.

(61 Design patents)

VOLUME XIX.

GRAPHOPHONE DESIGN PATENTS.

January 1917

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December 1917.

| | | | |
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| Design N° | 50,126, | English, J. C., | January 2, 1917, |
| | 50,139, | Parnall, A. E., | January 2, 1917, |
| | 50,210, | Sheble, H., | January 16, 1917, |
| | 50,363, | Sheble, H., | February 20, 1917, |
| | 50,364, | Sheble, H., | February 20, 1917, |
| | 50,388, | Jones, J. W., | February 27, 1917, |
| | 50,449, | Pitts, W. C., | March 13, 1917, |
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| | 50,478, | Moyer, H. C., | March 20, 1917, |
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| | 50,482, | Moyer, H. C., | March 20, 1917, |
| | 50,483, | Moyer, H. C., | March 20, 1917, |
| | 50,484, | Moyer, H. C., | March 20, 1917, |
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| | 50,610, | Cowan, W. K., | April 17, 1917, |
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| | 50,849, | Schiff, H. T., | May 29, 1917, |
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| | 50,969, | French, W. A., | June 26, 1917, |
| | 50,970, | French, W. A., | June 26, 1917, |
| | 50,971, | French, W. A., | June 26, 1917, |
| | 51,001, | Segal, H., | July 3, 1917, |
| | 51,007, | Wolff, J., | July 3, 1917, |
| | 51,056, | Cone, R.H., Jr., | July 24, 1917, |
| | 51,058, | Farb, P., | July 24, 1917, |
| | 51,059, | Farb, P., | July 24, 1917, |
| | 51,060, | Farb, P., | July 24, 1917, |
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| | 51,220, | Wolff, J., | August 28, 1917, |

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| 51,334, Hine, C., | October 9, 1917. |
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| 51,501, MacLachlan, L., | November 20, 1917. |
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| 51,503, MacLachlan, L., | November 20, 1917. |
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| 51,540, Poe, R. L., | December 4, 1917. |
| 51,543, Andresen, J. G., | December 11, 1917. |
| 51,596, Jacobs, A. E., | December 18, 1917. |
| 51,603, Merriam, J. G., | December 18, 1917. |
| 51,604, Merriam, J. G., | December 18, 1917. |
| 51,609, Scully, J. J., | December 18, 1917. |

DESIGN.

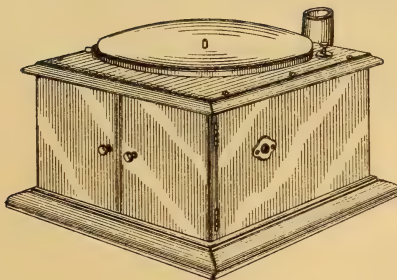
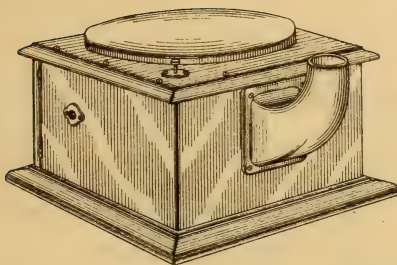
J. C. ENGLISH.

TALKING MACHINE CASING.

APPLICATION FILED JAN. 28, 1911.

50,126.

Patented Jan. 2, 1917.



WITNESSES

W. J. Hartmann.
A. J. Gardner.

BY

INVENTOR

John C. English.
James F. Peck.

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN C. ENGLISH, OF CAMDEN, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A TALKING-MACHINE CASING.

50,126.

Specification for Design.

Patented Jan. 2, 1917.

Application filed January 28, 1911. Serial No. 605,335. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOHN C. ENGLISH, a citizen of the United States, and a resident of the city of Camden, State of New Jersey, have invented a new, original, and ornamental Design for Talking-Machine Casings, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing, the upper figure is a rear view in perspective of a talking machine

casing, showing my new design; and the lower figure a front view in perspective of the same.

I claim:

The ornamental design for a talking machine casing, as shown.

JOHN C. ENGLISH.

Witnesses:

FRANK B. MIDDLETON, Jr.,
CHARLES F. WILLARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

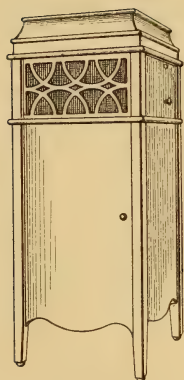
A. E. PARNALL.

TALKING MACHINE CABINET.

APPLICATION FILED SEPT. 18, 1916.

50,139.

Patented Jan. 2, 1917.

*Witnesses:**W. J. Smith*
*E. Kane**Inventor:**Archie E. Parnall*
By Jones, Addington, Ames & Seibold
Attys.

UNITED STATES PATENT OFFICE.

ARCHIE E. PARNALL, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,139.

Specification for Design.

Patented Jan. 2, 1917.

Application filed September 18, 1916. Serial No. 120,908. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, ARCHIE E. PARNALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and original and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to

the accompanying drawing, forming a part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for talking machine cabinet as shown.

ARCHIE E. PARNALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

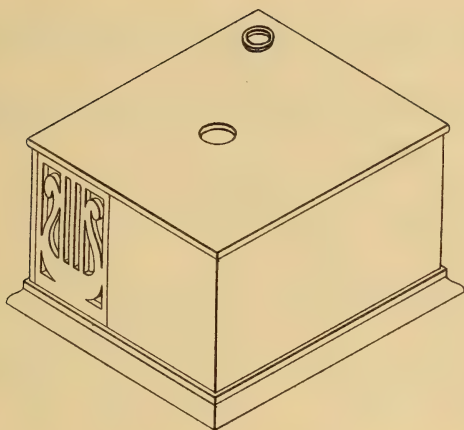
H. SHEBLE.

PHONOGRAPH CABINET.

APPLICATION FILED APR. 1, 1916.

50,210.

Patented Jan. 16, 1917.



INVENTOR
HORACE SHEBLE
BY HIS ATTORNEY
Harry Smith

UNITED STATES PATENT OFFICE.

HORACE SHEBLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO DOMESTIC TALKING MACHINE CORPORATION, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DESIGN FOR A PHONOGRAPH-CABINET.

50,210.

Specification for Design.

Patented Jan. 16, 1917.

Application filed April 1, 1916. Serial No. 88,399. Term of patent 7 years.

To all whom it may concern:

Be it known that I, HORACE SHEBLE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a new, original and ornamental Design for Phonograph-Cabinets, of which the following is a specification.

My design is shown in the accompanying drawing, which shows a perspective view of the phonograph cabinet.

I claim:

The ornamental design for a phonograph cabinet substantially as shown.

HORACE SHEBLE.

Witnesses:

KATE A. BEADLE,
HAMILTON D. TURNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

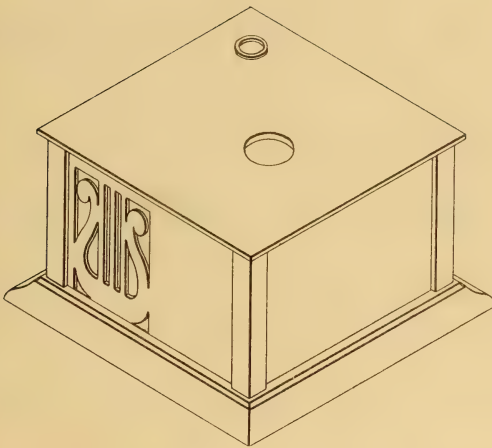
H. SHEBLE.

PHONOGRAPH CABINET.

APPLICATION FILED APR. 3, 1916.

50,363.

Patented Feb. 20, 1917.



INVENTOR
HORACE SHEBLE
BY HIS ATTORNEY
Harry Smith

UNITED STATES PATENT OFFICE.

HORACE SHEBLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO DOMESTIC TALKING MACHINE CORPORATION, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DESIGN FOR A PHONOGRAPH-CABINET.

50,363.

Specification for Design.

Patented Feb. 20, 1917.

Application filed April 3, 1916. Serial No. 88,728. Term of patent 7 years.

To all whom it may concern:

Be it known that I, HORACE SHEBLE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification.

My design is shown in the accompanying drawing, which shows a perspective view of the phonograph cabinet.

I claim:

The ornamental design for a phonograph cabinet substantially as shown.

HORACE SHEBLE.

Witnesses:

HAMILTON D. TURNER,
KATE A. BEADLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

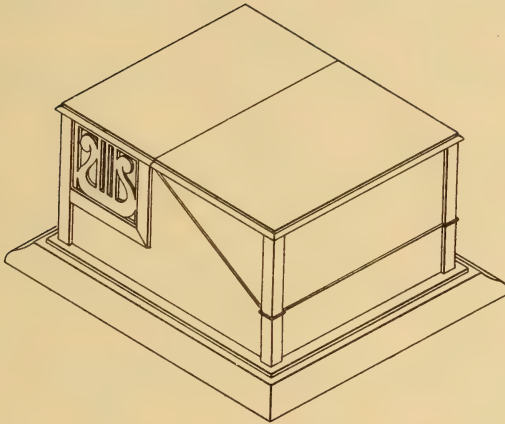
H. SHEBLE.

PHONOGRAPH CABINET.

APPLICATION FILED APR. 4, 1916.

50,364.

Patented Feb. 20, 1917.



INVENTOR
HORACE SHEBLE
BY HIS ATTORNEY
Harry Smith

UNITED STATES PATENT OFFICE.

HORACE SHEBLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO DOMESTIC TALKING MACHINE CORPORATION, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DESIGN FOR A PHONOGRAPH-CABINET.

50,364.

• Specification for Design.

Patented Feb. 20, 1917.

Application filed April 4, 1916. Serial No. 88,949. Term of patent 7 years.

To all whom it may concern:

Be it known that I, HORACE SHEBLE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification.

My design is shown in the accompanying drawing, which represents a perspective view of a phonograph cabinet embodying

my design, the cabinet being shown in the closed position.

I claim:

The ornamental design for a phonograph cabinet, as shown.

HORACE SHEBLE.

Witnesses:

KATE A. BEADLE,
HAMILTON D. TURNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



DESIGN.

J. W. JONES.

CASING FOR WINDING ATTACHMENTS FOR TALKING MACHINES.

APPLICATION FILED MAR. 4, 1916.

50,388.

Patented Feb. 27, 1917.

Fig. 1.

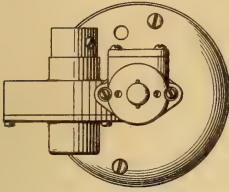


Fig. 2.

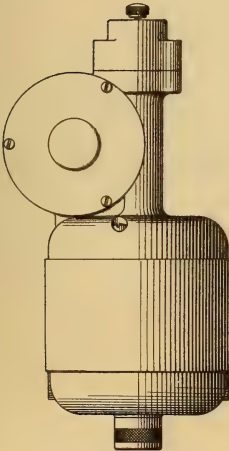


Fig. 3.

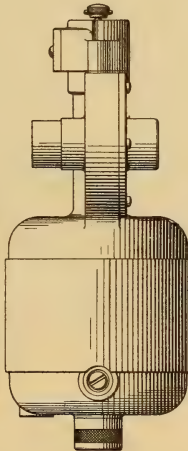
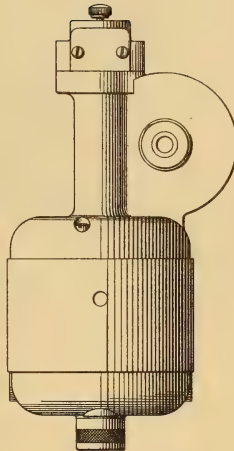


Fig. 4.



Witness:
Harry S. Fleischer

Inventor:
Joseph W. Jones
by *attorneys*
Harmon & Leonard

UNITED STATES PATENT OFFICE.

JOSEPH W. JONES, OF PELHAM, NEW YORK, ASSIGNOR TO JONES MOTROLA, INC., OF
NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DESIGN FOR A CASING FOR WINDING ATTACHMENTS FOR TALKING-MACHINES.

50,388.

Specification for Design.

Patented Feb. 27, 1917.

Application filed March 4, 1916. Serial No. 82,257. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOSEPH W. JONES, a citizen of the United States, and resident of Pelham, in the county of Westchester and State of New York, have invented a new, original, and ornamental Design for a Casing for Winding Attachments for Talking-Machines, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

My new design for a casing for winding

attachments for talking machines is shown in the accompanying drawing, in which—

Figure 1 is a top plan view,

Fig. 2 is a front view,

Fig. 3 is a side view, and

Fig. 4 is a back view.

I claim:

The ornamental design for a casing for winding attachments for talking machines, as shown.

JOSEPH W. JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

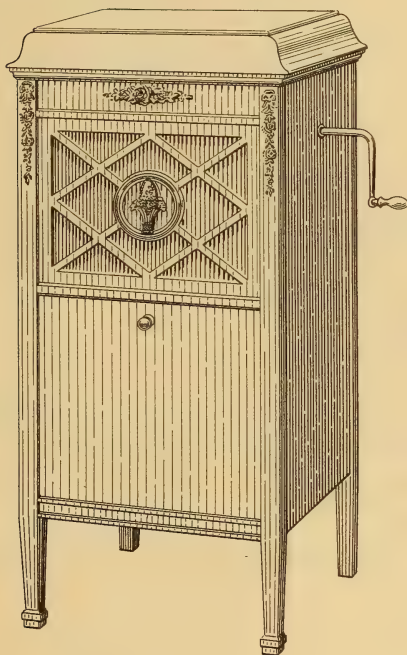
W. C. PITTS.

PHONOGRAPH CABINET.

APPLICATION FILED DEC. 26, 1916.

50,449.

Patented Mar. 13, 1917.



INVENTOR
Walter C. Pitts
BY
Dyer & Campfield
ATTORNEYS

UNITED STATES PATENT OFFICE.

WALTER C. PITTS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SOLOPHONE COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A PHONOGRAPH-CABINET.

50,449.

Specification for Design.

Patented Mar. 13, 1917.

Application filed December 26, 1916. Serial No. 139,059. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WALTER C. PITTS, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to

the accompanying drawing, forming part thereof.

The figure is a perspective view of a phonograph cabinet, showing my new design.

I claim:

The original design for a phonograph cabinet, as shown.

WALTER C. PITTS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

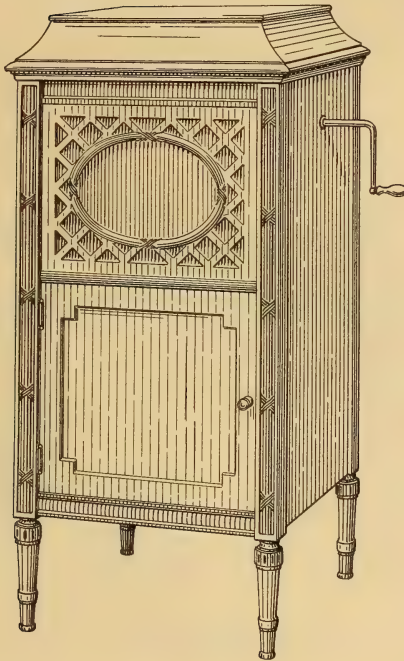
W. C. PITTS.

PHONOGRAPH CABINET.

APPLICATION FILED DEC. 26, 1916.

50,450.

Patented Mar. 13, 1917.



INVENTOR
Walter C. Pitts
BY *Sykes & Camfield,*
ATTORNEYS

UNITED STATES PATENT OFFICE.

WALTER C. PITTS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SOLOPHONE COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A PHONOGRAPH-CABINET.

50,450.

Specification for Design.

Patented Mar. 13, 1917.

Application filed December 26, 1916. Serial No. 139,060. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WALTER C. PITTS, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to

the accompanying drawing, forming part thereof.

The figure is a perspective view of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

WALTER C. PITTS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

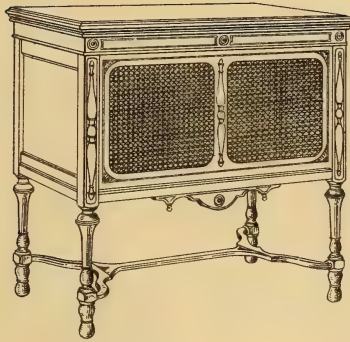
H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,478.

Patented Mar. 20, 1917.



Witness:

Harry S. Gauthier

Inventor:

Horace C. Moyer
by Frajerlach
Att'y

UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,478.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,321. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing, the figure is a perspective

of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,479.

Patented Mar. 20, 1917.



Witness:

Harry S. Gaither

Inventor:

Horace C. Moyer

by Fred Gerlach
his Att'y

UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,479.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,322. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing: the figure is a perspec-

tive of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

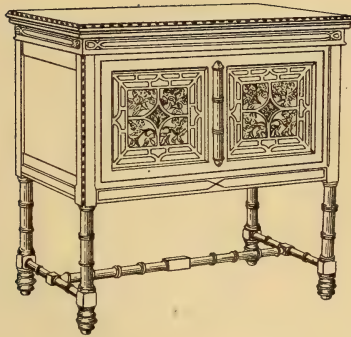
H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,480.

Patented Mar. 20, 1917.



Witness:

Harry S. Gauthier

Inventor.

Norace L. Moyer

by *Fred Gerdeloh*
his Att'y

UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,480.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,323. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

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tive of a phonograph cabinet showing my new design.

I claim:

The ornamental design for a phonograph cabinet as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

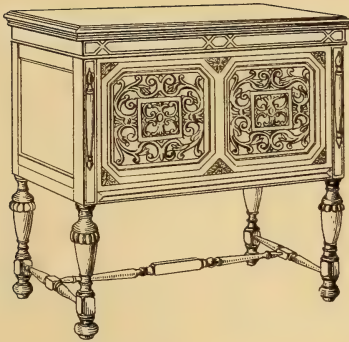
H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,481.

Patented Mar. 20, 1917.



Witness:

Harry S. Gaither

Inventor

Horace C. Moyer

by Fred Gulack

Atty

UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,481.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,324. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

In the drawing: the figure is a perspective

of a phonograph cabinet showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

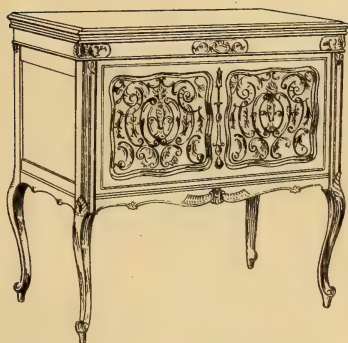
H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,482.

Patented Mar. 20, 1917.



Witness:

Harry S. Gaither

Inventor:

Horace C. Moyer
by *Fred Gulick*
his atty.

UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,482.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,325. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing: the figure is a perspective

of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

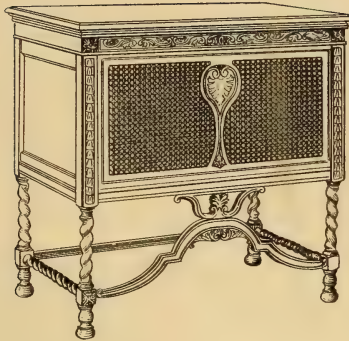
H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,483.

Patented Mar. 20, 1917.



Witness:

Harry S. Gaither

Inventor

Horace B. Moyer
by Frazer & Co.



UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,483.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,326. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing: the figure is a perspective

of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

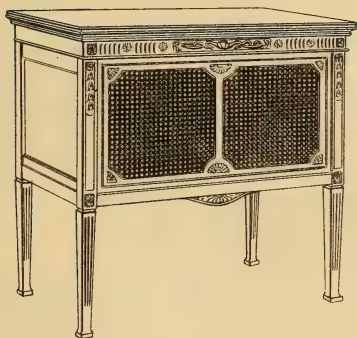
H. C. MOYER.

PHONOGRAPH CABINET.

APPLICATION FILED JAN. 2, 1917.

50,484.

Patented Mar. 20, 1917.



Witness:

Harry S. Gaither

Inventor

Horace C. Moyer

by Fred Gerlach

his Atty

UNITED STATES PATENT OFFICE.

HORACE C. MOYER, OF OAK PARK, ILLINOIS, ASSIGNOR TO THE WINDSOR FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

50,484.

Specification for Design.

Patented Mar. 20, 1917.

Application filed January 2, 1917. Serial No. 140,327. Term of patent 14 years.

To all whom it may concern:

Be it known that I, HORACE C. MOYER, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing: the figure is a perspective

of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

HORACE C. MOYER.

Witnesses:

MILDRED STUMPF,
KATHARINE GERLACH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

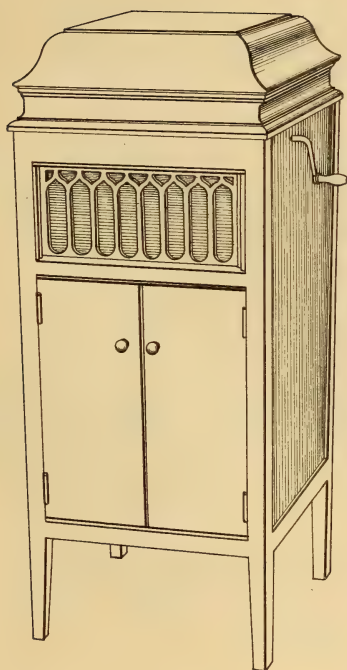
C. A. WHITE.

PHONOGRAPH CABINET.

APPLICATION FILED DEC. 5, 1916.

50,544.

Patented Mar. 27, 1917.



INVENTOR

BY

Clara A. White,
Jas. H. Griffin,
Attorneys

UNITED STATES PATENT OFFICE.

CLARA A. WHITE, OF BROOKLYN, NEW YORK.

DESIGN FOR A PHONOGRAPH-CABINET.

50,544.

Specification for Design.

Patented Mar. 27, 1917.

Application filed December 5, 1916. Serial No. 135,280. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, CLARA A. WHITE, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

CLARA A. WHITE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES PATENT OFFICE.

WILLIAM K. COWAN, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,608.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,930. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, WILLIAM K. COWAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for a talking machine cabinet as shown.

WILLIAM K. COWAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

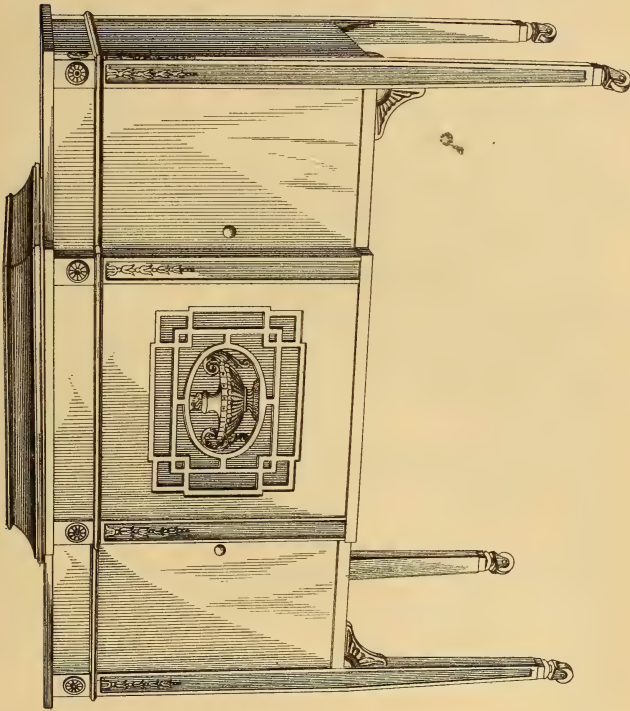
W. K. COWAN.

TALKING MACHINE CABINET.

APPLICATION FILED MAR. 6, 1917.

50,609.

Patented Apr. 17, 1917.



Witnesses:

Ed. Devine
L. J. Murray

Inventor:

William K. Cowan
by *Walters & Husley*
Attys

UNITED STATES PATENT OFFICE.

WILLIAM K. COWAN, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,609.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,931. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, WILLIAM K. COWAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for a talking machine cabinet as shown.

WILLIAM K. COWAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

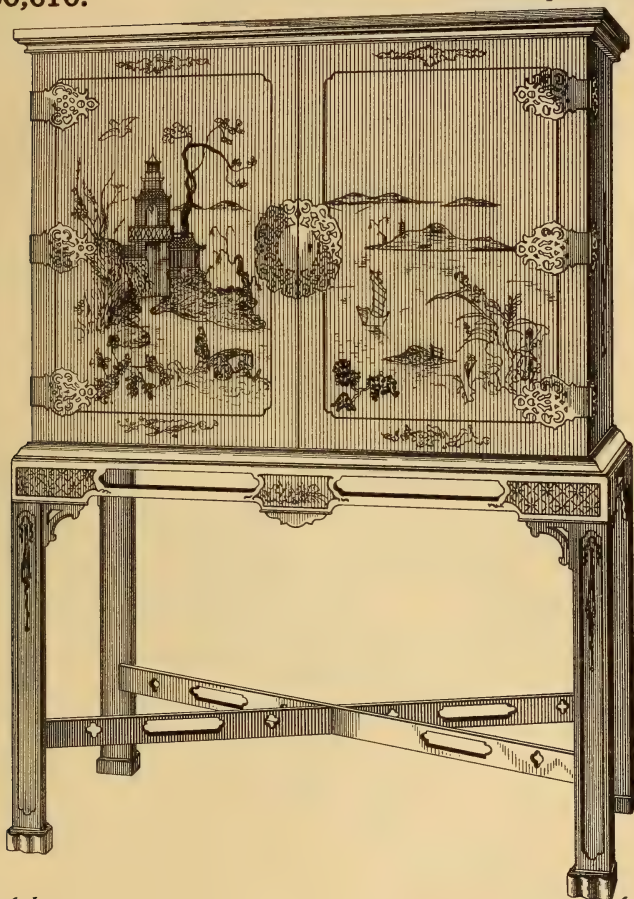
W. K. COWAN.

TALKING MACHINE CABINET.

APPLICATION FILED MAR. 6, 1917.

50,610.

Patented Apr. 17, 1917.



Witnesses:

Ed. C. Davis
L. Murray

Inventor
William K. Cowan

By Peterson & Murphy
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM K. COWAN, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,610.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,932. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, WILLIAM K. COWAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for a talking machine cabinet as shown.

WILLIAM K. COWAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

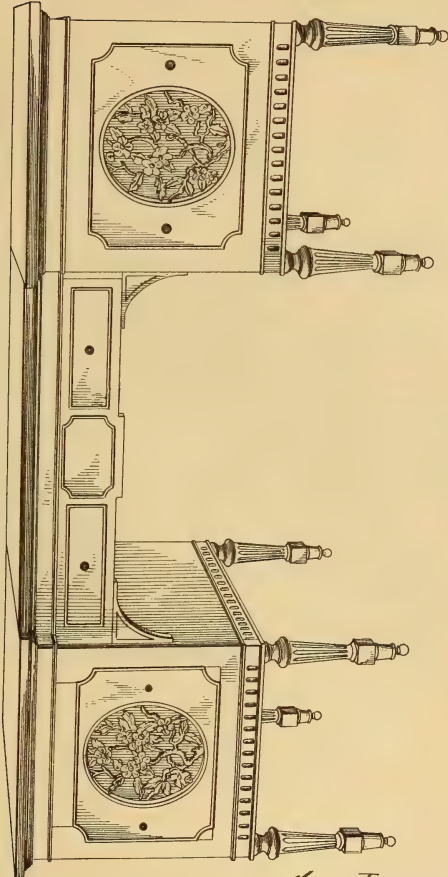
W. K. COWAN.

TALKING MACHINE CABINET.

APPLICATION FILED MAR. 6, 1917.

50,611.

Patented Apr. 17, 1917.



Witnesses:
Ed. Morrison
L. J. Murray

Inventor
William K. Cowan
By *Ed. Morrison & Husley* Attys.

UNITED STATES PATENT OFFICE.

WILLIAM K. COWAN, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,611.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,933. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, WILLIAM K. COWAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for a talking machine cabinet as shown.

WILLIAM K. COWAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

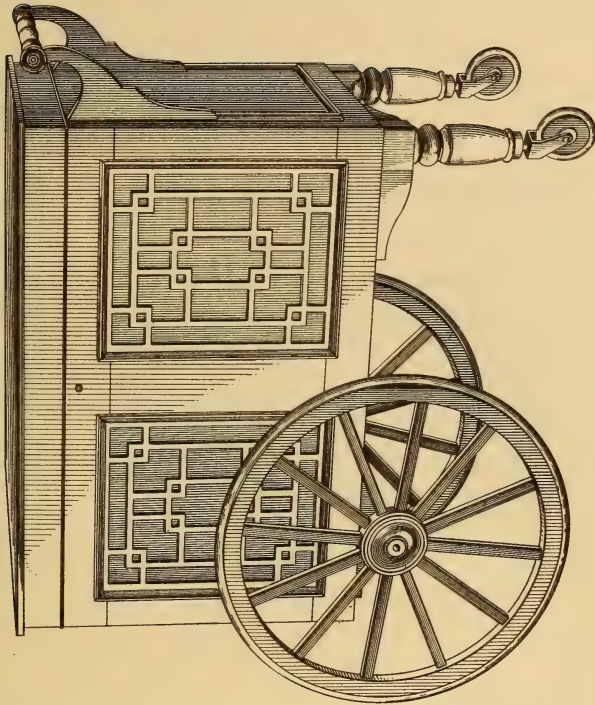
DESIGN.

W. K. COWAN.

TALKING MACHINE CABINET.
APPLICATION FILED MAR. 6, 1917.

50,612.

Patented Apr. 17, 1917.



Witnesses:
Ed. C. Devine
L. P. Murray

Inventor:
William K. Cowan
By *W. H. Hinson & H. H. Hinson*
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM K. COWAN, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,612.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,934. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, WILLIAM K. COWAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to

the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for a talking machine cabinet as shown.

WILLIAM K. COWAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

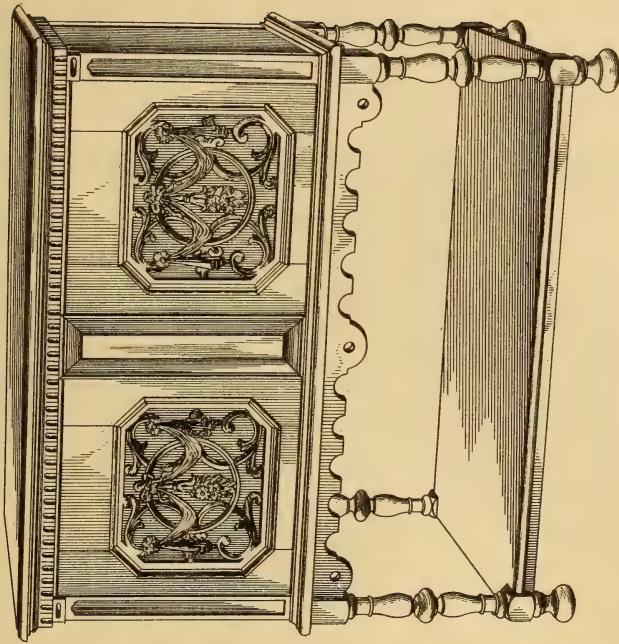
W. K. COWAN.

TALKING MACHINE CABINET.

APPLICATION FILED MAR. 6, 1917.

50,613.

Patented Apr. 17, 1917.



Witnesses:

Ed. L. Brown
L. Murray

Inventor
William K. Cowan
By *W. H. Emerson & H. H. Huxley*
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM K. COWAN, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

50,613.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,935. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, WILLIAM K. COWAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to

the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking machine cabinet showing my new design.

I claim:

The ornamental design for a talking machine cabinet as shown.

WILLIAM K. COWAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

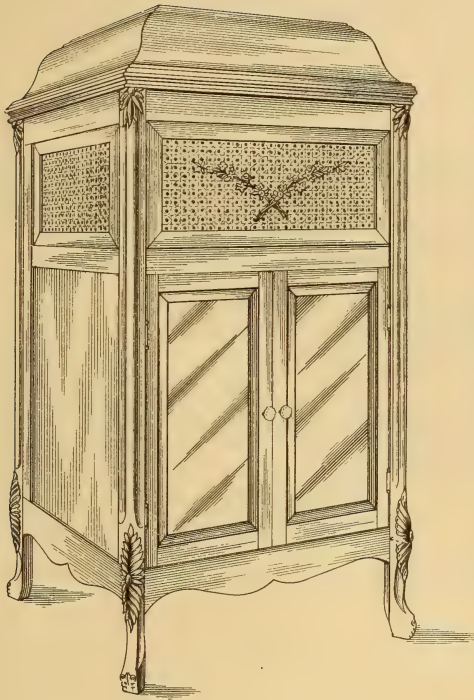
W. J. BAKER.

CABINET FOR PHONOGRAPHS.

APPLICATION FILED MAR. 6, 1917.

50,641.

Patented Apr. 17, 1917.



Witnesses:

E. E. Gaylord,
Chas. H. Buller

Inventor:

Walter J. Baker,
By R. B. Gayland,
Att'y



UNITED STATES PATENT OFFICE.

WALTER J. BAKER, OF CHICAGO, ILLINOIS.

DESIGN FOR A CABINET FOR PHONOGRAPHS.

50,641.

Specification for Design.

Patented Apr. 17, 1917.

Application filed March 6, 1917. Serial No. 152,941. Term of patent 3½ years.

To all whom it may concern:

Be it known that I, WALTER J. BAKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Cabinet for Phonographs, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a view in perspective of a

cabinet for phonographs, showing my new design.

I claim:

The ornamental design for a cabinet for phonographs, as shown.

WALTER J. BAKER.

Witnesses:

A. H. STANTON,
G. E. CHURCH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

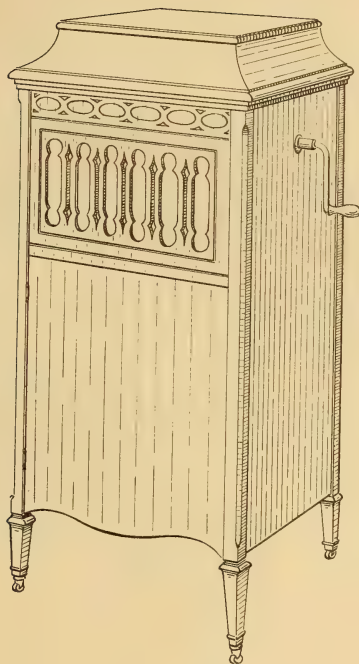
E. A. WIDMANN.

PHONOGRAPH CABINET.

APPLICATION FILED FEB. 24, 1917.

50,704.

Patented May 1, 1917.



INVENTOR
Eugene A. Widmann
by *H. H. Dyke*
ATTORNEY

UNITED STATES PATENT OFFICE.

EUGENE A. WIDMANN, OF BROOKLYN, NEW YORK, ASSIGNOR TO PATHÉ FRÈRES
PHONOGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

DESIGN FOR A PHONOGRAPH-CABINET.

50,704.

Specification for Design.

Patented May 1, 1917.

Application filed February 24, 1917. Serial No. 150,820. Term of patent 14 years.

To all whom it may concern:

Be it known that I, EUGENE A. WIDMANN, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

EUGENE A. WIDMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

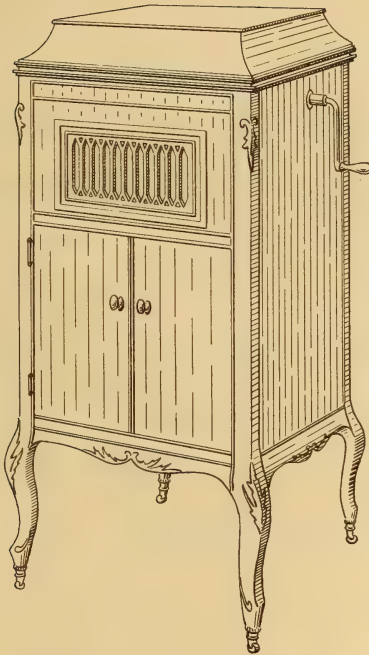
E. A. WIDMANN.

PHONOGRAPH CABINET.

APPLICATION FILED FEB. 24, 1917.

50,705.

Patented May 1, 1917.



INVENTOR
Eugene A. Widmann
by H. H. Dyke
ATTORNEY

UNITED STATES PATENT OFFICE.

EUGENE A. WIDMANN, OF BROOKLYN, NEW YORK, ASSIGNOR TO PATHÉ FRÈRES
PHONOGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

DESIGN FOR A PHONOGRAPH-CABINET.

50,705.

Specification for Design.

Patented May 1, 1917.

Application filed February 24, 1917. Serial No. 150,821. Term of patent 14 years.

To all whom it may concern:

Be it known that I, EUGENE A. WIDMANN, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

EUGENE A. WIDMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

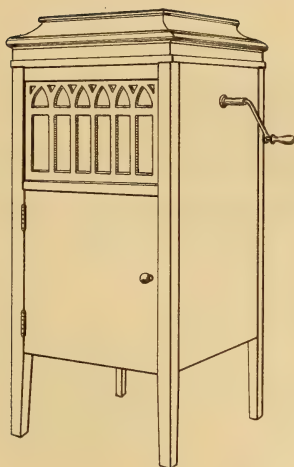
E. A. WIDMANN.

PHONOGRAPH CABINET.

APPLICATION FILED FEB. 24, 1917.

50,706.

Patented May 1, 1917.



INVENTOR

Eugene A. Widmann

BY

A. H. Dyke

ATTORNEY

UNITED STATES PATENT OFFICE.

EUGENE A. WIDMANN, OF BROOKLYN, NEW YORK, ASSIGNOR TO PATHÉ FRÈRES
PHONOGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

DESIGN FOR A PHONOGRAPH-CABINET.

50,706.

Specification for Design.

Patented May 1, 1917.

Application filed February 24, 1917. Serial No. 150,822. Term of patent 14 years.

To all whom it may concern:

Be it known that I, EUGENE A. WIDMANN, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a phonograph cabinet, showing my new design.

I claim:

The ornamental design for a phonograph cabinet, as shown.

EUGENE A. WIDMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

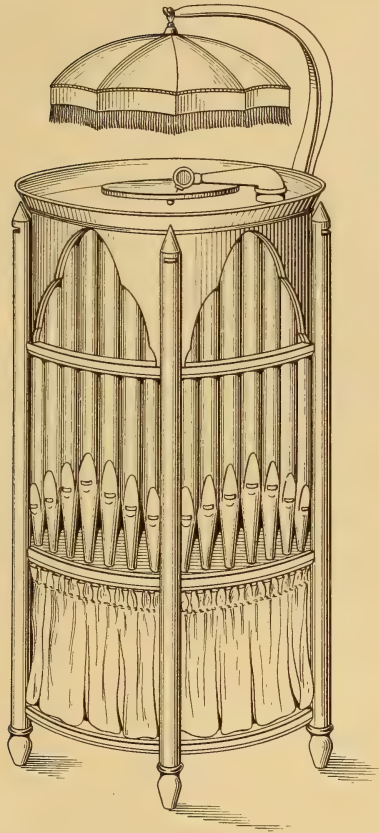
H. D. DARLINGTON.

TALKING MACHINE CABINET.

APPLICATION FILED FEB. 23, 1915.

50,775.

Patented May 15, 1917.



WITNESSES

Friedrick Nischl.
Bloffe

INVENTOR
H.D. Darlington

BY *Munn Co*
ATTORNEYS

UNITED STATES PATENT OFFICE.

HOWARD D. DARLINGTON, OF DAYTON, OHIO.

DESIGN FOR A TALKING-MACHINE CABINET.

50,775.

Specification for Design.

Patented May 15, 1917.

Application filed February 23, 1915. Serial No. 150,588. Term of patent 7 years.

To all whom it may concern:

Be it known that I, HOWARD D. DARLINGTON, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a talking-machine cabinet showing my new design.

I claim:

The ornamental design for a talking-machine cabinet as shown.

HOWARD D. DARLINGTON

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

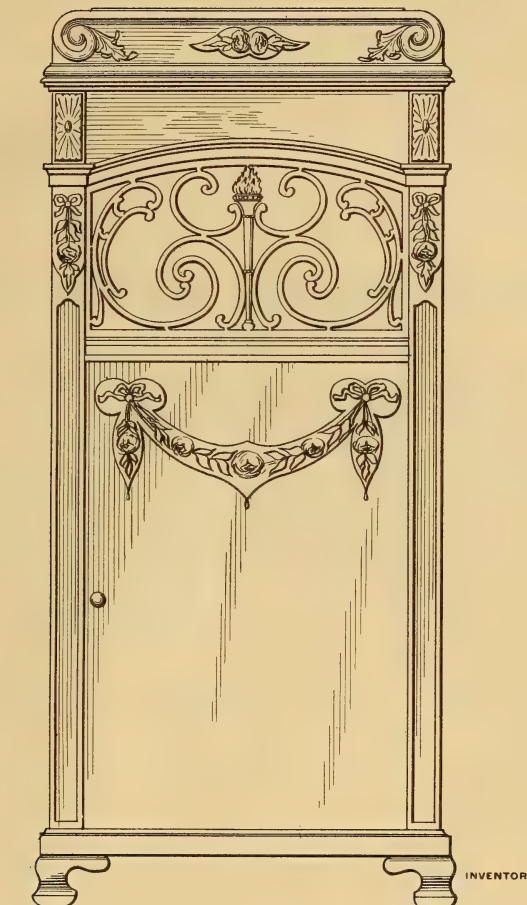
H. T. SCHIFF.

CASING FOR SOUND REPRODUCING MACHINES.

APPLICATION FILED JAN. 18, 1917.

50,849.

Patented May 29, 1917.



INVENTOR

Henry T. Schiff

By *J. J. Johnson, Jr.*
Att'y.

UNITED STATES PATENT OFFICE.

HENRY T. SCHIFF, OF CHICAGO, ILLINOIS.

DESIGN FOR A CASING FOR SOUND-REPRODUCING MACHINES.

50,849.

Specification for Design.

Patented May 29, 1917.

Application filed January 18, 1917. Serial No. 143,183. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, HENRY T. SCHIFF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Casing for Sound-Reproducing Machines, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a view in elevation of a casing for sound reproducing machine showing my new design.

I claim:

The ornamental design for a casing for sound reproducing machine as shown.

HENRY T. SCHIFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



DESIGN.

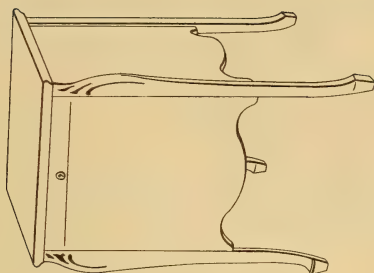
J. WOLFF.

RECORD CABINET.

APPLICATION FILED MAR. 10, 1917.

50,859.

Patented May 29, 1917.



Inventor
Joseph Wolff
By his Attorney's
Schuchter & Litch

UNITED STATES PATENT OFFICE.

JOSEPH WOLFF, OF BROOKLYN, NEW YORK, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A RECORD-CABINET.

50,859.

Specification for Design.

Patented May 29, 1917.

Application filed March 10, 1917. Serial No. 154,043. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOSEPH WOLFF, a subject of His Majesty the King of Great Britain, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented a new, original, and ornamental Design for Record-Cabinets, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The figure is a perspective view of a record cabinet illustrating my improved design.

I claim:

The ornamental design for a record cabinet, substantially as shown.

This specification signed and witnessed this 26th day of February, 1917.

JOSEPH WOLFF.

Witnesses:

WILLIAM VARIN,
FRANK J. COUPE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

THE HISTORY OF THE UNITED STATES

OF THE UNITED STATES OF AMERICA
FROM THE FIRST SETTLEMENTS TO THE PRESENT TIME

BY
JAMES M. SMITH

VOLUME I
FROM THE FIRST SETTLEMENTS TO THE REVOLUTION
NEW YORK: PUBLISHED BY J. B. LIPPINCOTT, 15 N. 2ND ST. 1854

DESIGN.

W. A. FRENCH.
MUSIC CABINET.

APPLICATION FILED JAN. 29, 1917.

50,966.

Patented June 26, 1917.

Fig. 2

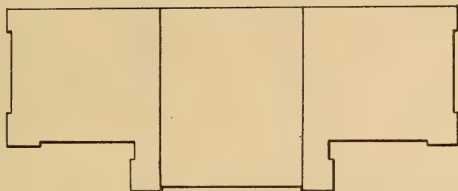
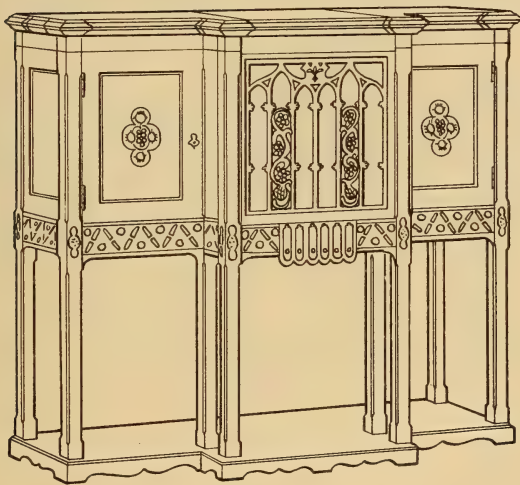


Fig. 1



Inventor:
William A. French
By *A. C. Whiteley*
his Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM A. FRENCH, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A MUSIC-CABINET.

50,966.

Specification for Design.

Patented June 26, 1917.

Application filed January 29, 1917. Serial No. 145,327. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WILLIAM A. FRENCH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new, original, and ornamental Design for a Music-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a perspective view of a music

cabinet embodying and illustrating my novel design. Fig. 2 is a plan view of the same.

I claim:

The ornamental design for a music cabinet, as shown.

WILLIAM A. FRENCH.

Witnesses:

CHAS. G. FRENCH,
A. L. SPALDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO, CHICAGO, ILLINOIS
OFFICE OF THE DEAN OF THE FACULTY

CHICAGO, ILLINOIS, MAY 1, 1906

DEAR MR. [Name]:

I have your letter of April 27, 1906, regarding the

appointment of a new member to the Faculty of the

Department of [Department Name].

The Faculty has considered your suggestion and

has decided to appoint [Name] as a member of the

Faculty of the Department of [Department Name].

I am, therefore, pleased to inform you that your

suggestion has been accepted.

DESIGN.

W. A. FRENCH.
MUSIC CABINET.

APPLICATION FILED JAN. 29, 1917.

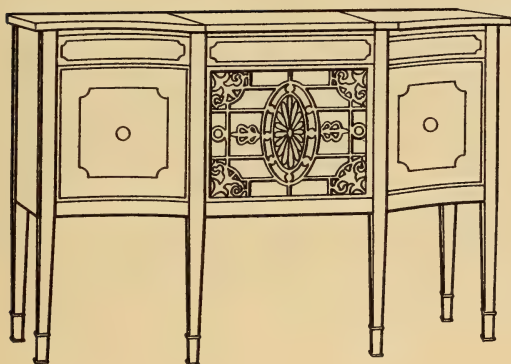
50,967.

Patented June 26, 1917.

Fig. 2



Fig. 1



Inventor:
William A. French
By *W. A. Whiteley*
his Attorney

UNITED STATES PATENT OFFICE.

WILLIAM A. FRENCH, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A MUSIC-CABINET.

50,967.

Specification for Design.

Patented June 26, 1917.

Application filed January 29, 1917. Serial No. 145,328. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WILLIAM A. FRENCH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new, original, and ornamental Design for a Music-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a perspective view of a music

cabinet embodying and illustrating my novel design. Fig. 2 is a plan view of the same.

I claim:

The ornamental design for a music cabinet, as shown.

WILLIAM A. FRENCH.

Witnesses:

CHAS. G. FRENCH,
A. L. SPALDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

W. A. FRENCH.

MUSIC CABINET.

APPLICATION FILED JAN. 29, 1917.

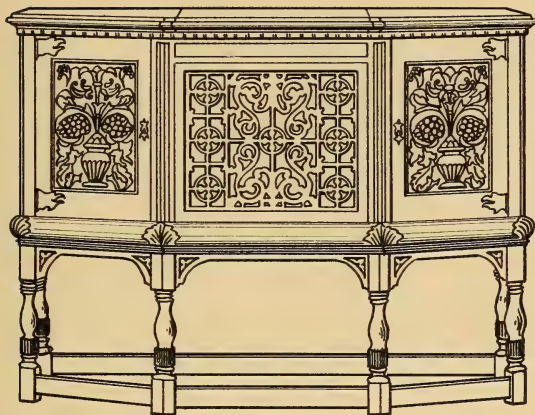
50,968.

Fig. 2

Patented June 26, 1917.



Fig. 1



Inventor:
William A. French
By *W. A. Whiteley*
his Attorney.



UNITED STATES PATENT OFFICE.

WILLIAM A. FRENCH, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A MUSIC-CABINET.

50,968.

Specification for Design.

Patented June 26, 1917.

Application filed January 29, 1917. Serial No. 145,329. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WILLIAM A. FRENCH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new, original, and ornamental Design for a Music-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a perspective view of a music

cabinet embodying and illustrating my novel design. Fig. 2 is a plan view of the same.

I claim:

The ornamental design for a music cabinet, as shown.

WILLIAM A. FRENCH.

Witnesses:

CHAS. G. FRENCH,
A. L. SPALDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

W. A. FRENCH.
MUSIC CABINET.

APPLICATION FILED JAN. 29, 1917.

50,969.

Patented June 26, 1917.

Fig. 2

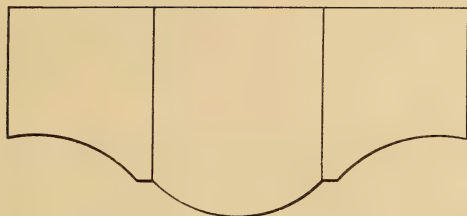


Fig. 1



Inventor:
William A. French
By *P. A. Whitely*
his Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM A. FRENCH, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A MUSIC-CABINET.

50,969.

Specification for Design.

Patented June 26, 1917.

Application filed January 29, 1917. Serial No. 145,330. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WILLIAM A. FRENCH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new, original, and ornamental Design for a Music-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a perspective view of a music

cabinet embodying and illustrating my novel design. Fig. 2 is a plan view of the same.

I claim:

The ornamental design for a music cabinet, as shown.

WILLIAM A. FRENCH.

Witnesses:

CHAS. G. FRENCH,
A. L. SPALDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES PATENT OFFICE

INVENTOR: [Faint text, likely a name]

BY: [Faint text, likely a signature]

WITNESSES: [Faint text]

DATE: [Faint text]

FILED: [Faint text]

ATTEST: [Faint text]

COMMISSIONER OF PATENTS

DESIGN.

W. A. FRENCH.

MUSIC CABINET.

APPLICATION FILED JAN. 29, 1917.

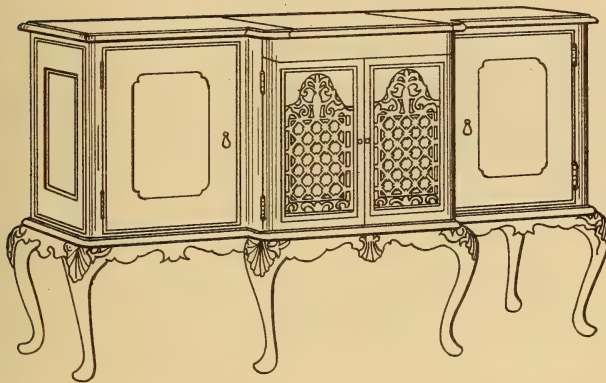
50,970.

Patented June 26, 1917.

Fig. 2



Fig. 1



Inventor:
William A. French
By *A. C. Whiteley*
his Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM A. FRENCH, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A MUSIC-CABINET.

50,970.

Specification for Design.

Patented June 26, 1917.

Application filed January 29, 1917. Serial No. 145,331. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WILLIAM A. FRENCH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new, original, and ornamental Design for a Music-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a perspective view of a music

cabinet embodying and illustrating my novel design. Fig. 2 is a plan view of the same.

I claim:

The ornamental design for a music cabinet, as shown.

WILLIAM A. FRENCH.

Witnesses:

CHAS. G. FRENCH,
A. L. SPALDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

W. A. FRENCH.
MUSIC CABINET.

APPLICATION FILED JAN. 29, 1917.

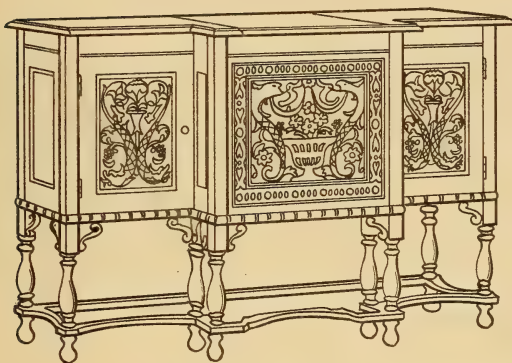
50,971.

Patented June 26, 1917.

Fig. 2



Fig. 1



Inventor:
William A. French
By *P. A. Whittey*
his Attorney

UNITED STATES PATENT OFFICE.

WILLIAM A. FRENCH, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DESIGN FOR A MUSIC-CABINET.

50,971.

Specification for Design.

Patented June 26, 1917.

Application filed January 29, 1917. Serial No. 145,332. Term of patent 14 years.

To all whom it may concern:

Be it known that I, WILLIAM A. FRENCH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new, original, and ornamental Design for a Music-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a perspective view of a music

cabinet embodying and illustrating my novel design. Fig. 2 is a plan view of the same.

I claim:

The ornamental design for a music cabinet, as shown.

WILLIAM A. FRENCH.

Witnesses:

CHAS. G. FRENCH,
A. L. SPALDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

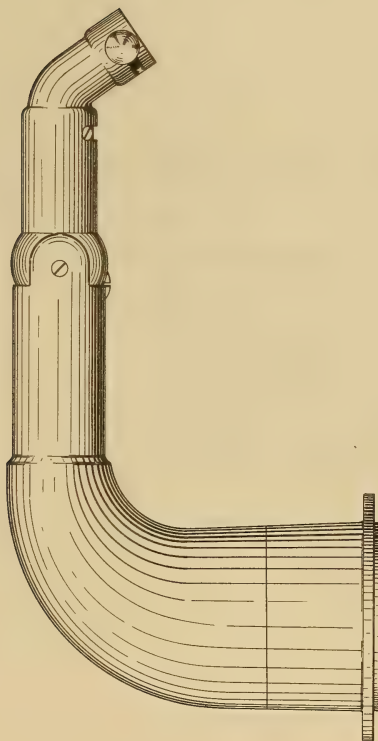
H. SEGAL.

TONE ARM FOR TALKING MACHINES.

APPLICATION FILED APR. 18, 1917.

51,001.

Patented July 3, 1917.



Inventor
Herman Segal
By his Attorney
Ivan E. A. Konigsberg

UNITED STATES PATENT OFFICE.

HERMAN SEGAL, OF NEW YORK, N. Y.

DESIGN FOR A TONE-ARM FOR TALKING-MACHINES.

51,001.

Specification for Design.

Patented July 3, 1917.

Application filed April 18, 1917. Serial No. 163,086. Term of patent 7 years.

To all whom it may concern:

Be it known that I, HERMAN SEGAL, a citizen of the United States, residing at city of New York, county of Bronx, State of New York, have invented a new, original, and ornamental Design for Tone-Arms for Talking-Machines, of which the following is a specification, reference being had to

the accompanying drawing, forming part thereof.

The figure is a side view of a tone arm for talking machines showing my new design.

I claim.

The ornamental design for a tone arm for talking machines, as shown.

HERMAN SEGAL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

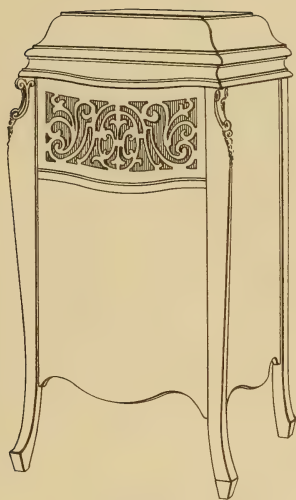
J. WOLFF.

PHONOGRAPH CABINET.

APPLICATION FILED APR. 25, 1917.

51,007.

Patented July 3, 1917.



Inventor
Joseph Wolff
by Schlichter & Loch
Attys.

UNITED STATES PATENT OFFICE.

JOSEPH WOLFF, OF BROOKLYN, NEW YORK, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A PHONOGRAPH-CABINET.

51,007.

Specification for Design.

Patented July 3, 1917.

Application filed April 25, 1917. Serial No. 164,573. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOSEPH WOLFF, a subject of His Majesty the King of Great Britain, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The figure is a perspective view of a pho-

nograph cabinet illustrating my improved design.

I claim:—

The ornamental design for a phonograph cabinet, substantially as shown.

This specification signed and witnessed this 23rd day of April, 1917.

JOSEPH WOLFF.

Witnesses:

WILLIAM W. COOK,

L. Y. GIBSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES PATENT OFFICE

DESIGN.

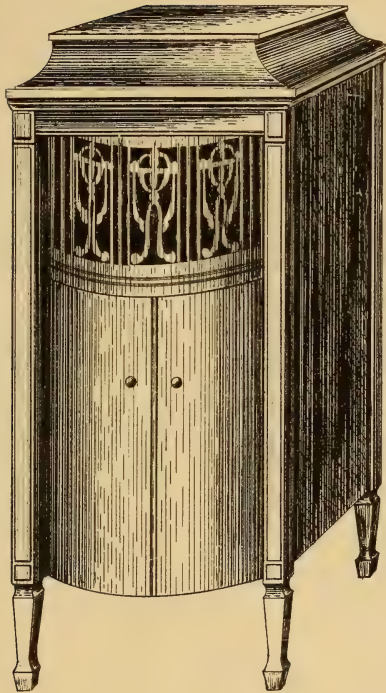
R. H. CONE, JR.

CABINET FOR TALKING MACHINES.

APPLICATION FILED MAY 5, 1917.

51,056.

Patented July 24, 1917.



INVENTOR:

Robert H. Cone, Jr.
by Conrad R. Cone,

HIS ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT H. CONE, JR., OF ST. LOUIS, MISSOURI.

DESIGN FOR A CABINET FOR TALKING-MACHINES.

51,056.

Specification for Design.

Patented July 24, 1917.

Application filed May 5, 1917. Serial No. 166,757. Term of patent 7 years.

To all whom it may concern:

Be it known that I, ROBERT H. CONE, JR., a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new, original, and ornamental Design for Cabinets for Talking-Machines, of which the following is a specification.

In the accompanying drawing, which forms part of this specification,

The figure is a perspective view of a cabinet for talking machines embodying the design.

I claim:

The ornamental design for a cabinet for talking machines, as shown.

ROBT. H. CONE, JR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN

P. FARB.

TONE ARM.

APPLICATION FILED APR. 25, 1917.

51,058.

Patented July 24, 1917.

Fig. 1

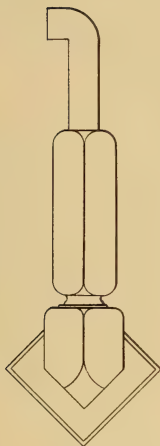


Fig. 4

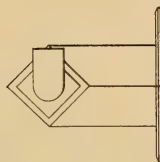


Fig. 2

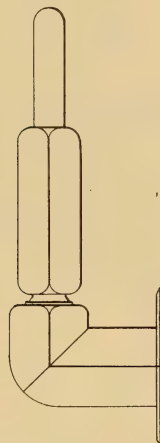
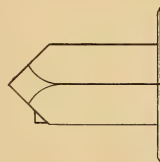


Fig. 3



Inventor
Pincus Farb
By his Attorneys
Schechter & Lotich

UNITED STATES PATENT OFFICE.

PINCUS FARB, OF NEWARK, NEW JERSEY, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A TONE-ARM.

51,058.

Specification for Design.

Patented July 24, 1917.

Application filed April 25, 1917. Serial No. 164,564. Term of patent 14 years.

To all whom it may concern:

Be it known that I, PINCUS FARB, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented a new, original, and ornamental Design for a Tone-Arm, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings,—

Figure 1 is a top plan view of a tone-arm illustrating my improved design;

Fig. 2 is a side elevation of my improved design;

Fig. 3 is a rear view of the same; and

Fig. 4 is a front view of the same.

I claim:—

The ornamental design for a tone-arm, substantially as shown.

This specification signed and witnessed this 16th day of April, 1917.

PINCUS FARB.

Witnesses:

WILLIAM VARIN,
FRANK J. COUPE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

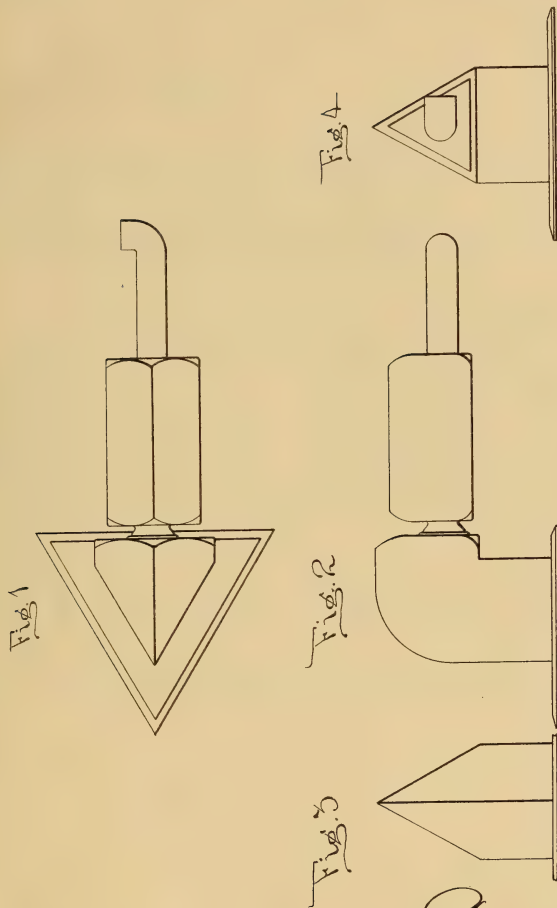
P. FARB.

TONE ARM.

APPLICATION FILED APR. 25, 1917.

51,059.

Patented July 24, 1917.



Inventor
Pinus Hart
By his Attorneys
Schuchman & Litch

UNITED STATES PATENT OFFICE.

PINCUS FARB, OF NEWARK, NEW JERSEY, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A TONE-ARM.

51,059.

Specification for Design.

Patented July 24, 1917.

Application filed April 25, 1917. Serial No. 164,565. Term of patent 14 years.

To all whom it may concern:

Be it known that I, PINCUS FARB, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented a new, original, and ornamental Design for a Tone-Arm, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings,—

Figure 1 is a top plan view of a tone-arm illustrating my improved design;

Fig. 2 is a side elevation of my improved design;

Fig. 3 is a rear view of the same; and

Fig. 4 is a front view of the same.

I claim:—

The ornamental design for a tone-arm, substantially as shown.

This specification signed and witnessed this 16th day of April, 1917.

PINCUS FARB.

Witnesses:

WILLIAM VARIN,

FRANK J. COUPE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES OF AMERICA

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

WASHINGTON, D. C. 20250

OFFICE OF THE ASSISTANT SECRETARY FOR LAND MANAGEMENT

1015 N. G ST. N.W. WASHINGTON, D. C. 20250

TELEPHONE (202) 733-6000

FACSIMILE (202) 733-6000

MAILING ADDRESS: BLM, WASHINGTON, D. C. 20250

FOR INFORMATION: BLM, WASHINGTON, D. C. 20250

DESIGN.

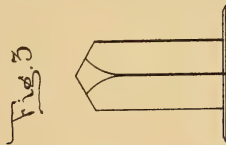
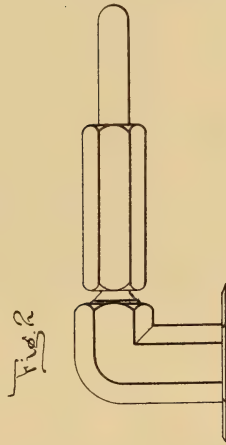
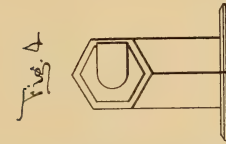
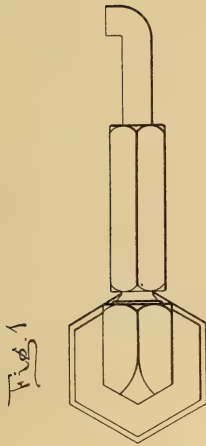
P. FARB.

TONE ARM.

APPLICATION FILED APR. 25, 1917.

51,060.

Patented July 24, 1917.



Inventor
Pincus Farb
By his Attorneys
Schechter & Loeb

UNITED STATES PATENT OFFICE.

PINCUS FARB, OF NEWARK, NEW JERSEY, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A TONE-ARM.

51,060.

Specification for Design.

Patented July 24, 1917.

Application filed April 25, 1917. Serial No. 164,566. Term of patent 14 years.

To all whom it may concern:

Be it known that I, PINCUS FARB, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented a new, original, and ornamental Design for a Tone-Arm, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings,—

Figure 1 is a top plan view of a tone-arm illustrating my improved design;

Fig. 2 is a side elevation of my improved design;

Fig. 3 is a rear view of the same; and

Fig. 4 is a front view of the same.

I claim:

The ornamental design for a tone-arm, substantially as shown.

This specification signed and witnessed this 16th day of April, 1917.

PINCUS FARB.

Witnesses:

WILLIAM VARIN,
FRANK J. COUPE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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1000 S. MICHIGAN AVE. CHICAGO, ILL. 60607

TEL. 733-4331

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The University of Chicago Library is a research library and is open to all researchers. It is a member of the Association of Research Libraries (ARL) and the Association of American Universities (AAU). It is also a member of the American Library Association (ALA) and the American Association of University Libraries (AAUL).

DESIGN.

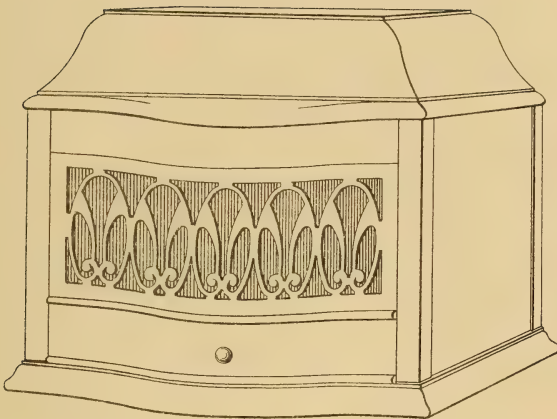
J. WOLFF.

PHONOGRAPH CABINET.

APPLICATION FILED FEB. 1, 1917.

51,219.

Patented Aug. 28, 1917.



Inventor
Joseph Wolff
by Schechter & Lotz
his *Attys.*

UNITED STATES PATENT OFFICE.

JOSEPH WOLFF, OF BROOKLYN, NEW YORK, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A PHONOGRAPH-CABINET.

51,219.

Specification for Design.

Patented Aug. 28, 1917.

Application filed February 1, 1917. Serial No. 146,039. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOSEPH WOLFF, a subject of His Majesty the King of Great Britain, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The figure is a perspective view of a pho-

nograph cabinet illustrating my improved design.

I claim:

The ornamental design for a phonograph cabinet, substantially as shown.

This specification signed and witnessed this 3rd day of January, 1917.

JOSEPH WOLFF.

Witnesses:

FRANK J. COUPE,
J. HERMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

J. WOLFF.

PHONOGRAPH CABINET.

APPLICATION FILED FEB. 1, 1917.

Patented Aug. 28, 1917.

51,220.

Fig. 1.

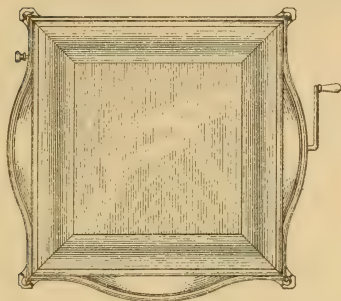
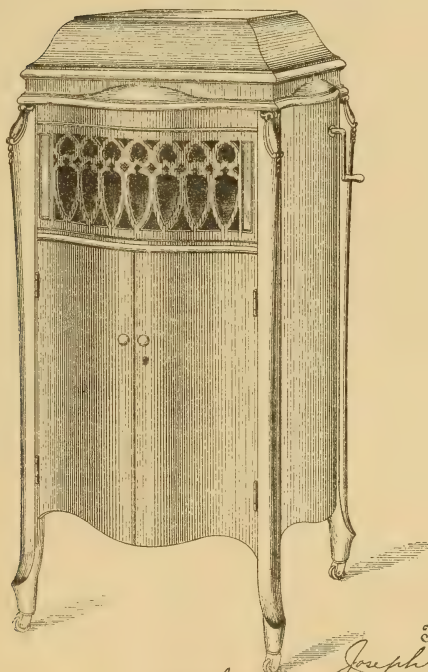


Fig. 2



Inventor
Joseph Wolff
By his Attorneys
Schuchter & Litch

UNITED STATES PATENT OFFICE.

JOSEPH WOLFF, OF BROOKLYN, NEW YORK, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

DESIGN FOR A PHONOGRAPH-CABINET.

51,220.

Specification for Design.

Patented Aug. 28, 1917.

Application filed February 1, 1917. Serial No. 146,040. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOSEPH WOLFF, a subject of His Majesty the King of Great Britain, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented a new, original, and ornamental Design for Phonograph-Cabinets, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings,—

Figure 1 is a top plan view of a phono-

graph cabinet illustrating my improved design;

Fig. 2 is a perspective view thereof.

I claim:

The ornamental design for a phonograph cabinet, substantially as shown.

This specification signed and witnessed this 5th day of January, 1917.

JOSEPH WOLFF.

Witnesses:

A. J. HERMAN,
I. S. SOLOMON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

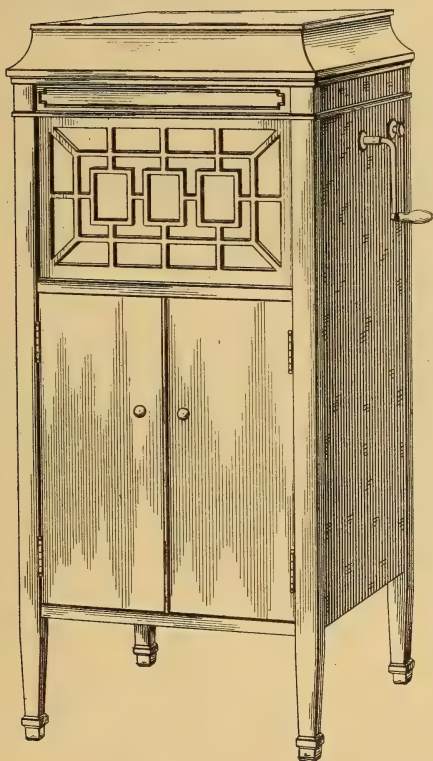
C. HINE.

TALKING MACHINE CABINET.

APPLICATION FILED AUG. 24, 1917.

51,334.

Patented Oct. 9, 1917.



Inventor

Cicero Hine.

Wm. O. Bell

Attorney.

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,334.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,069. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking - Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof

and showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

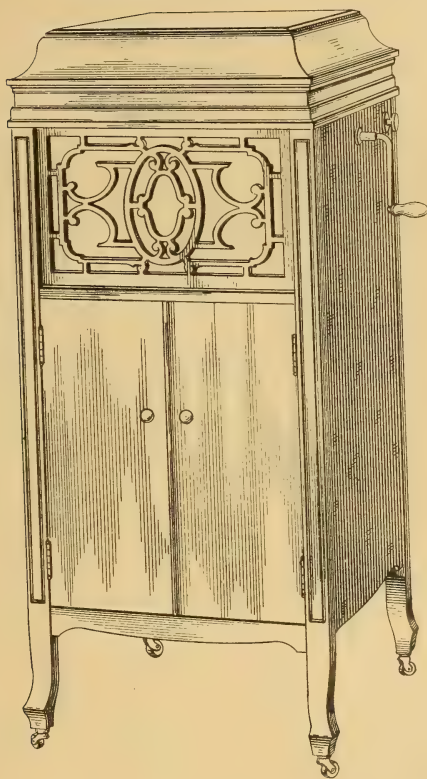
DESIGN.

C. HINE.

TALKING MACHINE CABINET.
APPLICATION FILED AUG. 24, 1917.

51,335.

Patented Oct. 9, 1917.



Inventor
C. Hine
By *Wm. C. Best*
Attorney

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,335.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,070. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking-Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof, and

showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

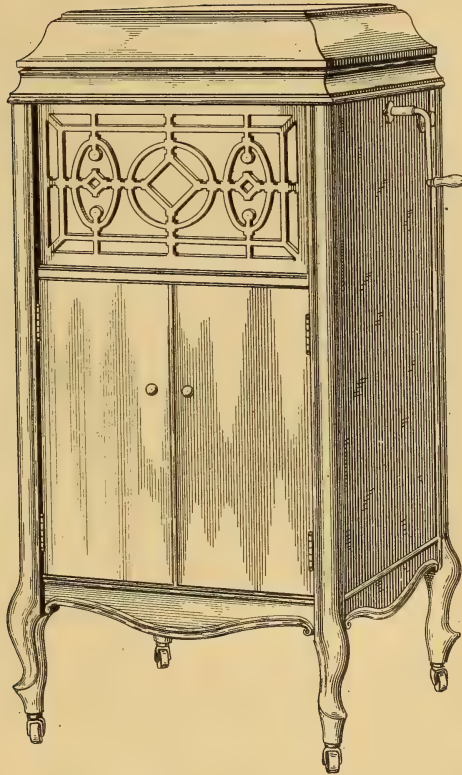
C. HINE.

TALKING MACHINE CABINET.

APPLICATION FILED AUG. 24, 1917.

51,336.

Patented Oct. 9, 1917.



Inventor

Cicero Hine

Wm. O. Bell

Attorney

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,336.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,071. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking-Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof,

and showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

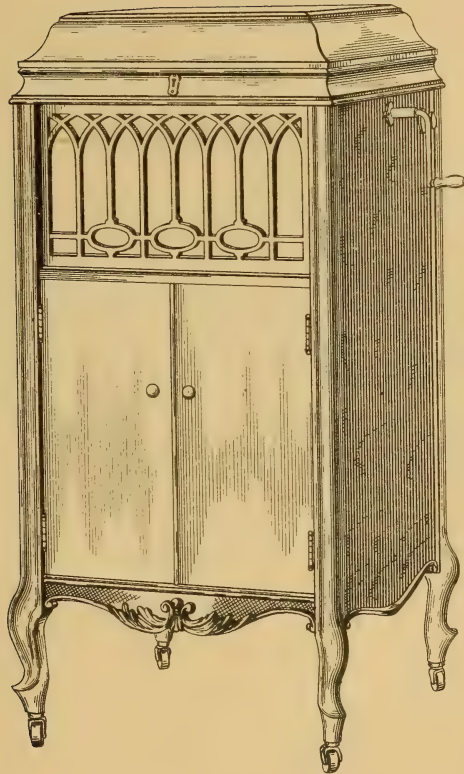
DESIGN.

C. HINE.

TALKING MACHINE CABINET.
APPLICATION FILED AUG. 24, 1917.

51,837.

Patented Oct. 9, 1917.



Inventor
Licero Hine
By *Wm. H. Bell*
Attorney.

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS. ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,337.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,072. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking-Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof,

and showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES PATENT OFFICE

OFFICE OF THE COMMISSIONER OF PATENTS AND TRADE MARKS
WASHINGTON, D. C. 20540

Patent Office Building, Washington, D. C. 20540

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Patent Office Building, Washington, D. C. 20540

Patent Office Building, Washington, D. C. 20540

DESIGN.

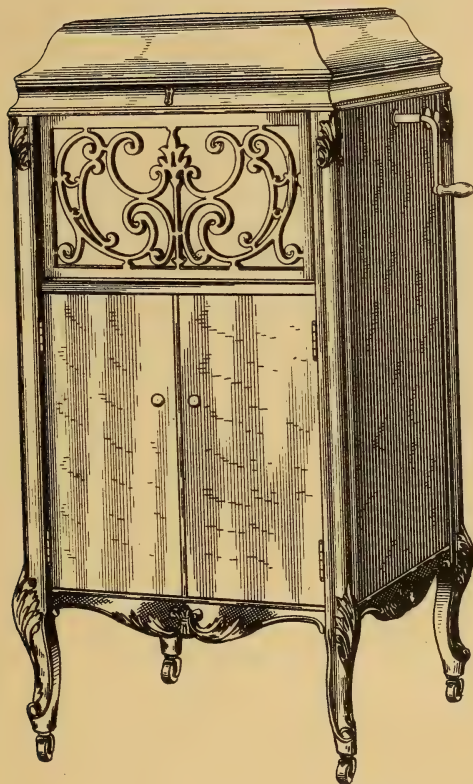
C. HINE.

TALKING MACHINE CABINET.

APPLICATION FILED AUG. 24, 1917.

51,338.

Patented Oct. 9, 1917.



Inventor
Cicero Hine
Wm. O. Bell
Attorney



UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,338.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,073. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking-Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof, and

showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

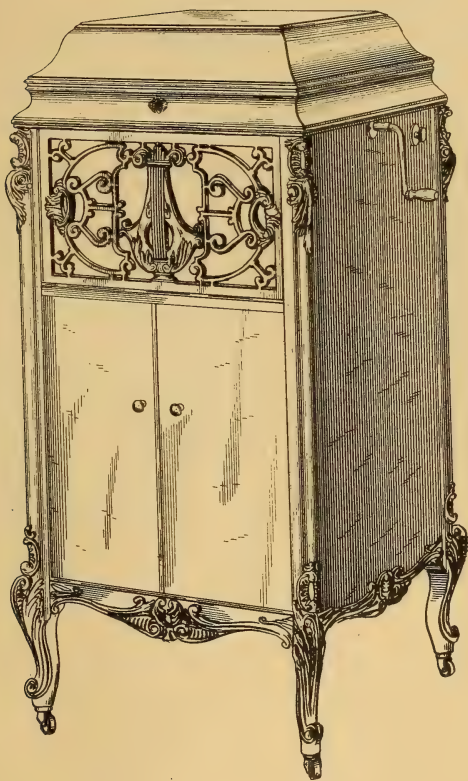
C. HINE.

TALKING MACHINE CABINET.

APPLICATION FILED AUG. 24, 1917.

51,339.

Patented Oct. 9, 1917.



Inventor
Cicero Hine
Wm. O. Bell
Attorney

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,339.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 133,074. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking-Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof and

showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

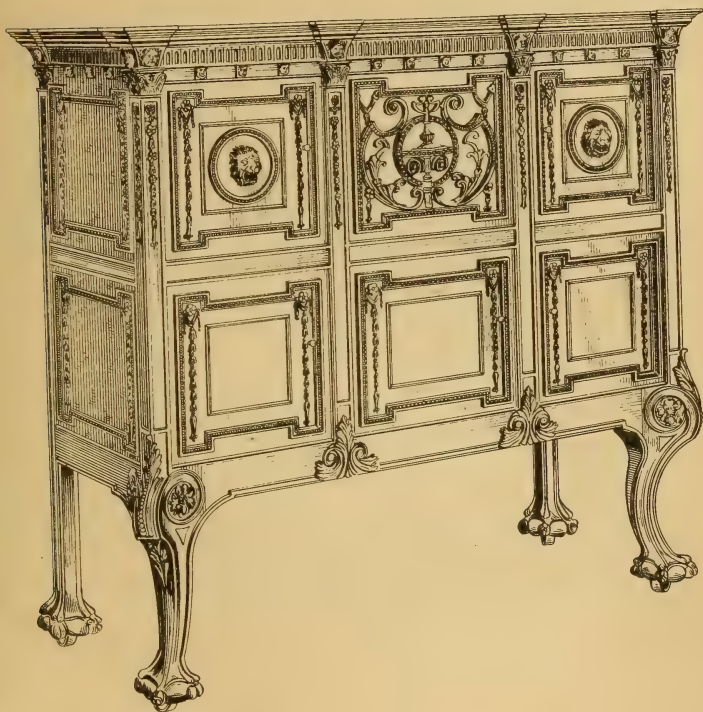
C. HINE.

TALKING MACHINE CABINET.

APPLICATION FILED AUG. 24, 1917.

51,340.

Patented Oct. 9, 1917.



Inventor

Cicero Hine

By

Wm. C. Beck

Attorney

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,340.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,075. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking - Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof

and showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

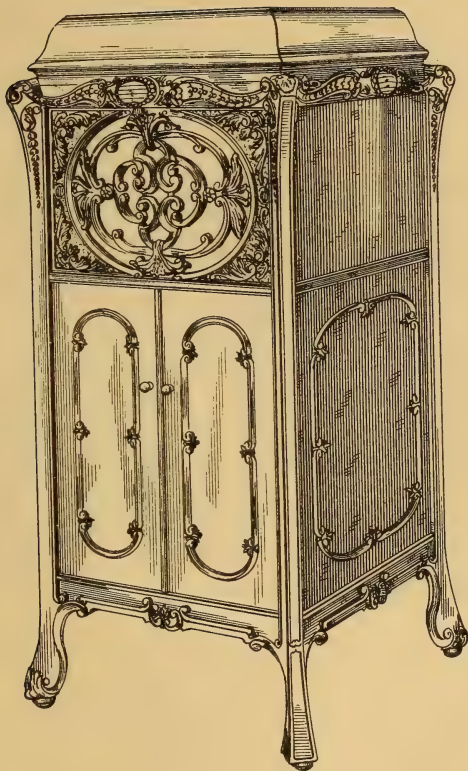
C. HINE.

TALKING MACHINE CABINET.

APPLICATION FILED AUG. 24, 1917.

51,341.

Patented Oct. 9, 1917.



Inventor
Cicero Hine
By *Wm. F. Bell*
Attorney

UNITED STATES PATENT OFFICE.

CICERO HINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

DESIGN FOR A TALKING-MACHINE CABINET.

51,341.

Specification for Design.

Patented Oct. 9, 1917.

Application filed August 24, 1917. Serial No. 188,076. Term of patent 7 years.

To all whom it may concern:

Be it known that I, CICERO HINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for Talking-Machine Cabinets, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof

and showing a perspective view of a cabinet embodying my invention.

I claim:

The ornamental design for a talking machine cabinet as shown.

CICERO HINE.

Witnesses:

WM. P. ATKINSON,
H. J. DIRKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

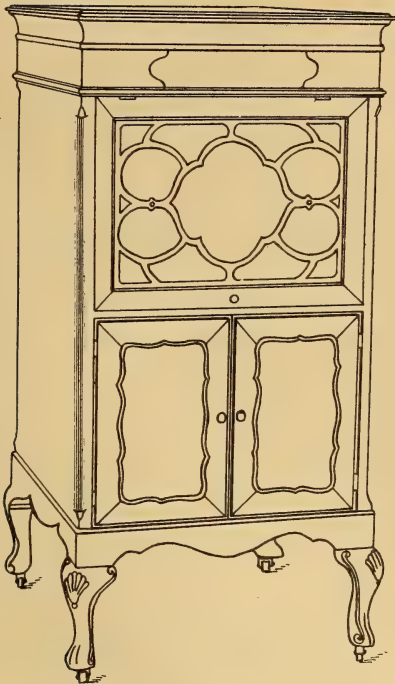
L. MacLACHLAN.

CASING FOR SOUND PRODUCING INSTRUMENTS.

APPLICATION FILED OCT. 5, 1917.

51,501.

Patented Nov. 20, 1917.



Inventor

Lachlan MacLachlan

By *Cyrus W. Rice*

his Attorney



UNITED STATES PATENT OFFICE.

LACHLAN MacLACHLAN, OF GRAND RAPIDS, MICHIGAN.

DESIGN FOR A CASING FOR SOUND-PRODUCING INSTRUMENTS.

51,501.

Specification for Design.

Patented Nov. 20, 1917.

Application filed October 5, 1917. Serial No. 194,996. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, LACHLAN MacLACHLAN, a subject of the King of England, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented a new, original, and ornamental Design for Casings for Sound-Producing Instruments, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a casing for sound producing instruments, showing my new design.

I claim:

The ornamental design for a casing for sound producing instruments, as shown.

LACHLAN MacLACHLAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

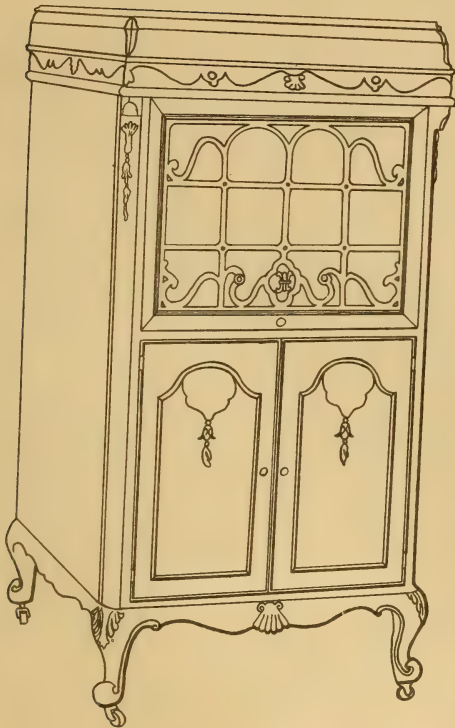
L. MacLACHLAN.

CASING FOR SOUND PRODUCING INSTRUMENTS.

APPLICATION FILED OCT. 5, 1917.

51,502.

Patented Nov. 20, 1917.



Inventor

Lachlan MacLachlan

By

Cyrus W. Rice

His Attorney

UNITED STATES PATENT OFFICE.

LACHLAN MACLACHLAN, OF GRAND RAPIDS, MICHIGAN.

DESIGN FOR A CASING FOR SOUND-PRODUCING INSTRUMENTS.

51,502.

Specification for Design.

Patented Nov. 20, 1917.

Application filed October 5, 1917. Serial No. 194,997. Term of patent 3½ years.

To all whom it may concern:

Be it known that I, LACHLAN MACLACHLAN, a subject of the King of England, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented a new, original, and ornamental Design for Casings for Sound-Producing Instruments, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a casing for sound producing instruments, showing my new design.

I claim:

The ornamental design for a casing for sound producing instruments, as shown.

LACHLAN MACLACHLAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

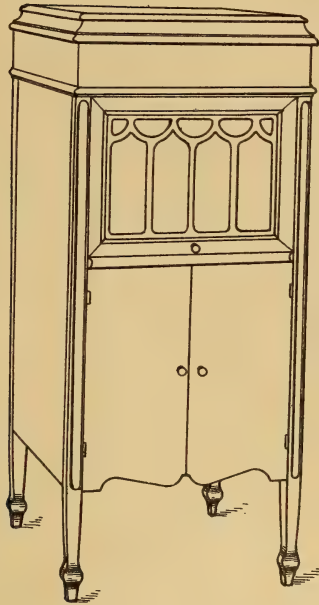
L. MacLACHLAN,

CASING FOR SOUND PRODUCING INSTRUMENTS.

APPLICATION FILED OCT. 5, 1917.

51,503.

Patented Nov. 20, 1917.



Inventor

Lachlan MacLachlan

By

Cyrus W. Rice

his Attorney

UNITED STATES PATENT OFFICE.

LACHLAN MacLACHLAN, OF GRAND RAPIDS, MICHIGAN.

DESIGN FOR A CASING FOR SOUND-PRODUCING INSTRUMENTS.

51,503.

Specification for Design.

Patented Nov. 20, 1917.

Application filed October 5, 1917. Serial No. 194,998. Term of patent 3½ years.

To all whom it may concern:

Be it known that I, LACHLAN MacLACHLAN, a subject of the King of England, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented a new, original, and ornamental Design for Casings for Sound-Producing Instruments, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of a casing for sound producing instruments, showing my new design.

I claim:

The ornamental design for a casing for sound producing instruments, as shown.

LACHLAN MacLACHLAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

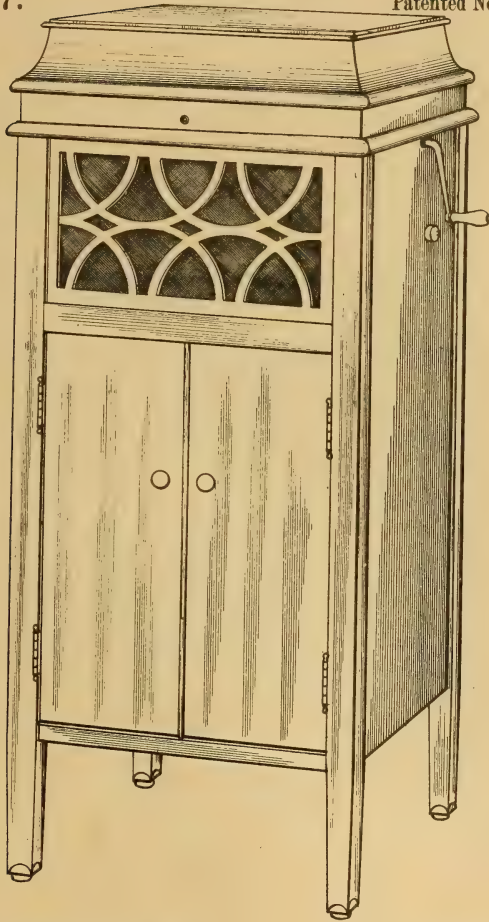
A. E. PARNALL.

PHONOGRAPH CABINET.

APPLICATION FILED AUG. 21, 1917.

51,507.

Patented Nov. 20, 1917.



WITNESSES
J. W. Angell
Charles F. Hill
by

INVENTOR
Archie E. Parnall
Charles F. Hill
ATTY

UNITED STATES PATENT OFFICE.

ARCHIE E. PARNALL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FRANK W. WILLIAMS, OF CHICAGO, ILLINOIS.

DESIGN FOR A PHONOGRAPH-CABINET.

51,507.

Specification for Design.

Patented Nov. 20, 1917.

Application filed August 21, 1917. Serial No. 187,427. Term of patent $3\frac{1}{2}$ years.

To all whom it may concern:

Be it known that I, ARCHIE E. PARNALL, a citizen of the United States, and residing in the city of Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is the specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings:

The drawings disclose a perspective view of a phonograph cabinet embodying this invention.

I claim:

The ornamental design for a phonograph cabinet, as shown.

ARCHIE E. PARNALL.

Witnesses:

FRANK W. WILLIAMS,
CHARLES W. HILLS, JR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

PUBLISHED WEEKLY
535 N. Dearborn Ave., Chicago, Ill.

Subscription price, Five Dollars Per Annum in Advance

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Copyright, 1919, by American Medical Association
Published by American Medical Association, 535 N. Dearborn Ave., Chicago, Ill.

Acceptance for mailing at special rate of postage provided for in Act of October 3, 1917, authorized on July 16, 1918. Postage paid at Chicago, Ill., and at additional mailing offices.

Postmaster: This publication is entered as second-class matter, October 3, 1917, under Post Office No. 384, at Chicago, Ill., under special agreement of Post Office and Post Office Department. Accepted for mailing at special rate of postage provided for in Act of October 3, 1917, authorized on July 16, 1918. Postage paid at Chicago, Ill., and at additional mailing offices.

Postage paid at Chicago, Ill., and at additional mailing offices.

DESIGN.

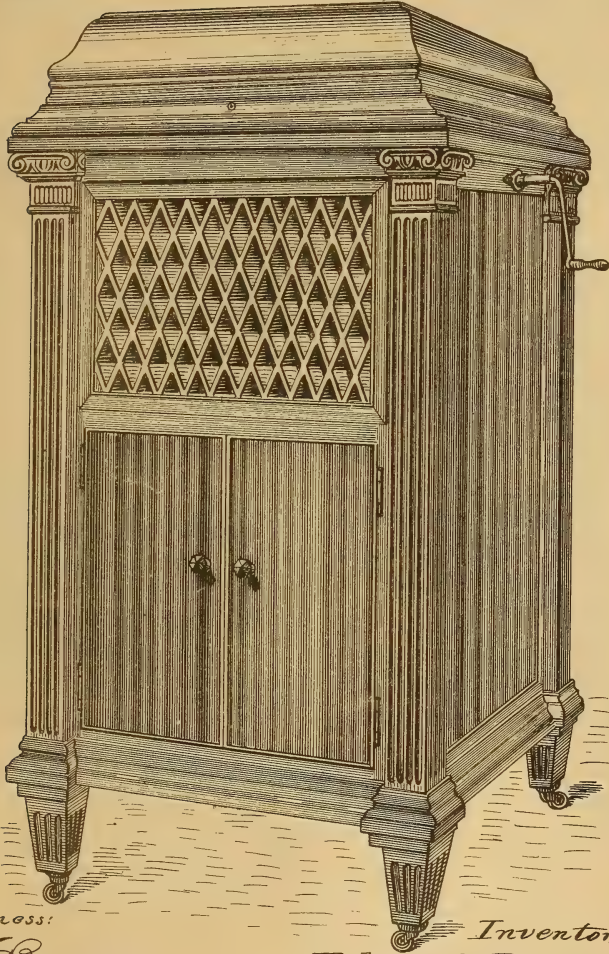
R. L. POE.

TALKING MACHINE CABINET.

APPLICATION FILED OCT. 20, 1917.

51,540.

Patented Dec. 4, 1917.



Witness:

C. Burnap By

Inventor:

Robert L. Poe

Wilkinson & Huxley, Attys



UNITED STATES PATENT OFFICE.

ROBERT L. POE, OF CHICAGO, ILLINOIS.

DESIGN FOR A TALKING-MACHINE CABINET.

51,540.

Specification for Design.

Patented Dec. 4, 1917.

Application filed October 20, 1917. Serial No. 197,736. Term of patent 7 years.

To all whom it may concern:

Be it known that I, ROBERT L. POE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new, original, and ornamental Design for a Talking-Machine Cabinet, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The figure is a perspective view of my new design for talking machine cabinet.

I claim

The ornamental design for a talking machine cabinet as shown.

ROBERT L. POE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

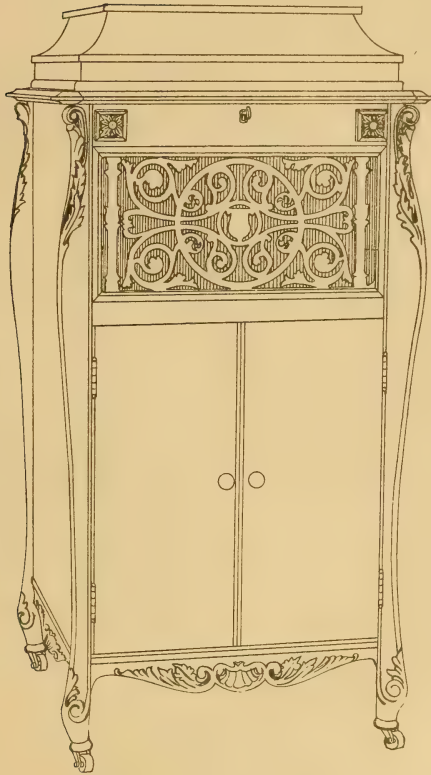
J. C. ANDRESEN.

PHONOGRAPH CABINET.

APPLICATION FILED AUG. 29, 1917.

51,543.

Patented Dec. 11, 1917.



Inventor:

John C. Andresen,

By his Atty, Gustav Drews



UNITED STATES PATENT OFFICE.

JOHN C. ANDRESEN, OF BROOKLYN, NEW YORK.

DESIGN FOR A PHONOGRAPH-CABINET.

51,543.

Specification for Design.

Patented Dec. 11, 1917.

Application filed August 29, 1917. Serial No. 188,874. Term of patent 3½ years.

To all whom it may concern:

Be it known that I, JOHN C. ANDRESEN, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and State of New York, have invented a new, original, and ornamental Design for a Phonograph-Cabinet, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

Referring to the annexed sheet of drawing, a perspective of a design for a phono-

graph-cabinet is shown, made in accordance with my invention.

I claim:

The ornamental design for a phonograph-cabinet as shown.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses this 27th day of August, 1917.

JOHN C. ANDRESEN.

Witnesses:

WALTHER A. ANDRESEN,
GUSTAV DREWS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

THE HISTORY OF THE UNITED STATES

OF THE

AMERICAN PEOPLE

FROM THE FIRST SETTLEMENTS TO THE PRESENT TIME

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NEW YORK

1900

THE

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LIBRARY

DESIGN.

A. E. JACOBS.

BELL SHAPED BASE FOR A PHONOGRAPH.

APPLICATION FILED JUNE 29, 1916.

Patented Dec. 18, 1917.

2 SHEETS—SHEET 1.

51,596.

FIG. 1

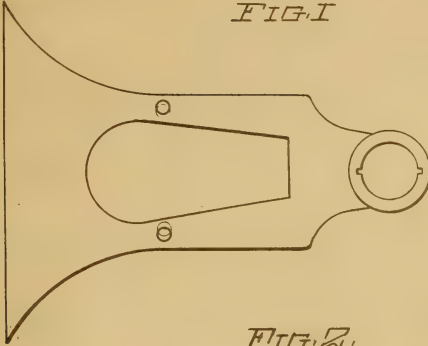


FIG. 2.

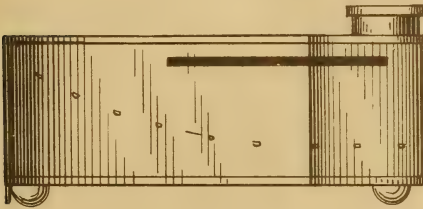
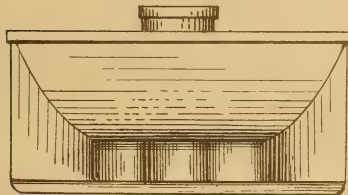


FIG. 3



Inventor
Arthur E. Jacobs
By *Wm. W. Jacobs*
Attorney.

UNITED STATES PATENT OFFICE.

ARTHUR E. JACOBS, OF CLEVELAND, OHIO.

DESIGN FOR A BELL-SHAPED BASE FOR A PHONOGRAPH.

51,596.

Specification for Design.

Patented Dec. 18, 1917.

Application filed June 29, 1916. Serial No. 106,737. Term of patent 7 years.

To all whom it may concern:

Be it known that I, ARTHUR E. JACOBS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new, original, and ornamental Design of a Bell-Shaped Base for a Phonograph, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof, wherein—

Figure 1 is a plan view of the base for a phonograph, showing my new design.

Fig. 2 is a side elevation thereof; Fig. 3 is a view of the open end of the bell shaped base; Fig. 4 is a perspective thereof.

I claim:

The ornamental design for a bell-shaped base for a phonograph, as shown.

ARTHUR E. JACOBS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

DESIGN.

J. G. MERRIAM.

PHONOGRAPH TURN TABLE.

APPLICATION FILED SEPT. 14, 1917.

51,603.

Patented Dec. 18, 1917.

Fig. 1.

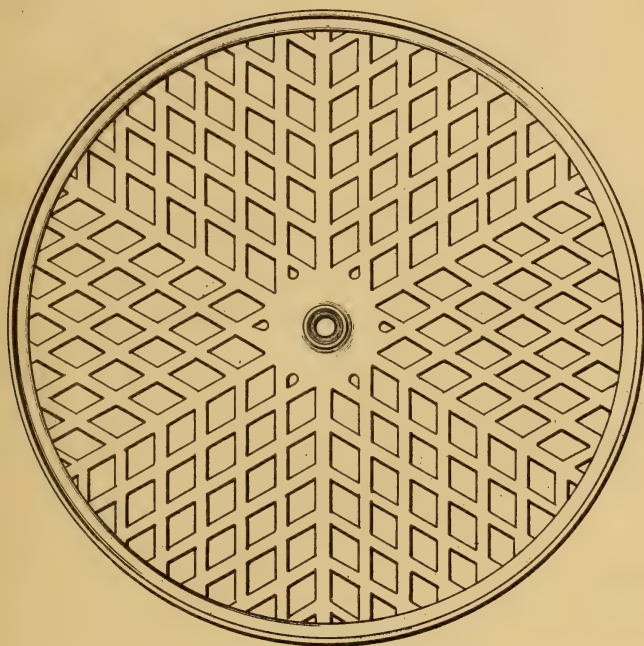


Fig. 2.



Inventor
Joseph G. Merriam
By his Attorney
Geo. H. Griffin

UNITED STATES PATENT OFFICE.

JOSEPH G. MERRIAM, OF MERIDEN, CONNECTICUT.

DESIGN FOR A PHONOGRAPH TURN-TABLE.

51,603.

Specification for Design.

Patented Dec. 18, 1917.

Application filed September 14, 1917. Serial No. 191,479. Term of patent 7 years.

To all whom it may concern:

Be it known that I, JOSEPH G. MERRIAM, a citizen of the United States, residing in Meriden, county of New Haven, State of Connecticut, have invented a new, original, and ornamental Design for a Phonograph Turn-Table, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

Referring to the drawing, Figure 1 is an

underneath plan view of a turn-table for phonographs embodying the design of the present invention, and

Fig. 2 is a side elevation of the turn-table shown in Fig. 1.

I claim:

The ornamental design for a phonograph turn-table as shown.

JOSEPH G. MERRIAM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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DESIGN.

J. G. MERRIAM.

PHONOGRAPH TURN TABLE.

APPLICATION FILED SEPT. 14, 1917.

51,604.

Patented Dec. 18, 1917.

Fig. 1.

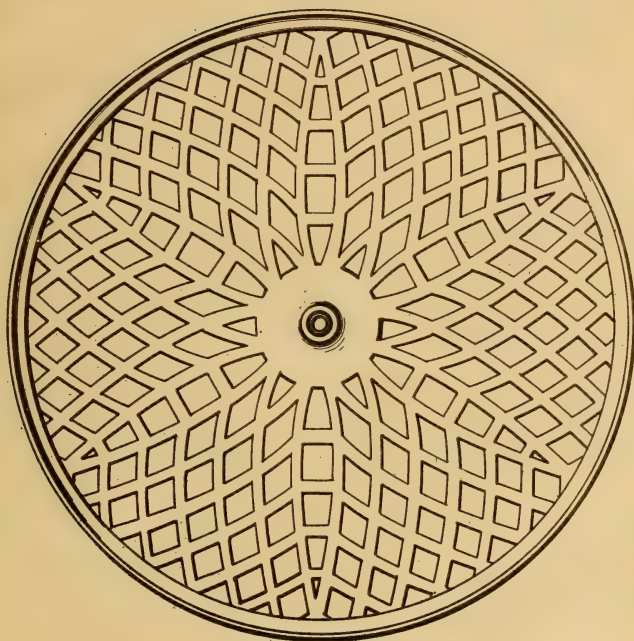


Fig. 2.



Inventor
Joseph A. Merriam
By *his Attorney*
Jas. H. Griffin

UNITED STATES PATENT OFFICE.

JOSEPH G. MERRIAM, OF MERIDEN, CONNECTICUT.

DESIGN FOR A PHONOGRAPH TURN-TABLE.

51,604.

Specification for Design.

Patented Dec. 18, 1917.

Application filed September 14, 1917. Serial No. 191,430. Term of patent 7 years.

To all whom it may concern:

Be it known that I, JOSEPH G. MERRIAM, a citizen of the United States, residing in Meriden, county of New Haven, State of Connecticut, have invented a new, original, and ornamental Design for a Phonograph Turn-Table, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

Referring to the drawing, Figure 1 is an

underneath plan view of a turn-table for phonographs embodying the design of the present invention, and

Fig. 2 is a side elevation of the turn-table shown in Fig. 1.

I claim:

The ornamental design for a phonograph turn-table as shown.

JOSEPH G. MERRIAM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES PATENT OFFICE

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WASHINGTON, D. C.

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1891

INVENTION OF

A METHOD OF PREPARING A
SOLUBLE AND STABLE
EMULSION OF OILS
AND FATS IN AQUEOUS
SOLUTIONS OF
SODIUM CARBONATE
AND POTASSIUM
CARBONATE

BY

DESIGN.

J. J. SCULLY.

SOUND BOX.

APPLICATION FILED OCT. 21, 1916.

51,609.

Patented Dec. 18, 1917.

Fig. 1.

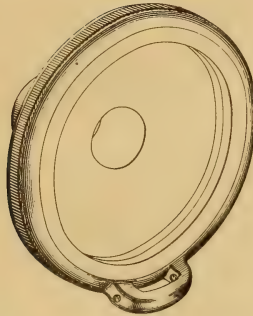


Fig. 2.

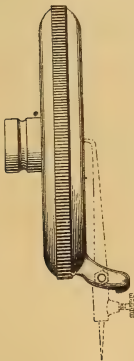
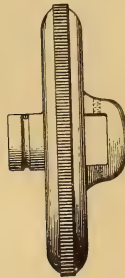


Fig. 3.



Inventor

John J. Scully.

By *Mauro, Cameron, Lewis & Mossie*

Attorneys



UNITED STATES PATENT OFFICE.

JOHN J. SCULLY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO AMERICAN
GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION
OF WEST VIRGINIA.

DESIGN FOR A SOUND-BOX.

51,609.

Specification for Design.

Patented Dec. 18, 1917.

Application filed October 21, 1916. Serial No. 127,026. Term of patent 14 years.

To all whom it may concern:

Be it known that I, JOHN J. SCULLY, a citizen of the United States of America, and a resident of Bridgeport, Connecticut (whose post-office address is care of American Graphophone Company, Bridgeport, Connecticut), have invented a new, original, and ornamental Design for Sound-Boxes, of which the following is a specification, reference being had to the annexed drawing, forming part thereof.

In said drawing:—

Figure 1 is a perspective view;

Fig. 2 is a side elevation showing in dotted lines the associated reproducing mechanism; and

Fig. 3 is a plan view of a sound box embodying my new design.

What is claimed is:—

The ornamental design for a sound box as shown.

In testimony whereof, I have signed this specification.

JOHN J. SCULLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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